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PRACTICAL

PHOTOGRAPHY,

ON

Glass and Paper,

A MANUAL,

CONTAINING SIMPLE DIRECTIONS FOR THE PRODUCTION OF

PORTRAITS, VIEWS, &c.

BY THE AGENCY OF LIGHT,

INCLUDING THE

COLLODION, ALBUMEN, CALOTYPE, WAXED PAPER, AND POSITIVE PAPER PROCESSES.

BY

CHARLES A. LONG.

LONDON:
PUBLISHED BY BLAND & LONG, OPTICIANS,
Photographical Instrument Makers, and Operative Chemists,
153, FLEET STREET.

ENTERED AT STATIONERS' HALL.

Price 1s.; per Post, 1s. 6d.

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PREFACE.

In the following pages I purpose to confine myself to a description of the Photographic processes on Paper and Glass, as being the two modes of fixing the luminous image that present the most difficulties to the beginner, and, moreover, are those which at the present time are occupying to the greatest extent the attention of the Photographic world.

Almost every one who has commenced this beautiful and fascinating Art, has felt the want to a greater or less extent of some Work which shall contain such simple and definite instructions as will enable him to succeed in the particular processes in which he may be engaged. It will therefore be my endeavour to transcribe to these pages the results of actual experiment, and to lay down those rules for the practice of the various processes which experience has shown to be attended with most success.

In carrying out this design, many variations in the *processes* will necessarily be omitted, but this will be found a convenience rather than the reverse to the beginner, as it is a generally admitted fact, that those Photographers who are content to follow some good process to the exclusion of others that have been but imperfectly tried, produce by far the best pictures with the least expenditure of time and trouble.

CHARLES A. LONG.

July, 1854.

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THE DARK ROOM.

THE room in which the various operations in the Photographic processes about to be described are conducted, should be so constructed that every ray of light can, if necessary, be shut out, especial care being bestowed on the exclusion of that element under and around the door: it is better if there be only one window, near which may be placed the operating table. The light from the window must be modified by placing before it a triple thickness of yellow calico; the light which enters through this screen will not affect the sensitive surfaces, but will enable the operator to conduct the process with ease and comfort. Should a window not be at command, the light of a candle can be used with advantage.

It will be found convenient when using the Paper process to have a broad shelf fitted up to hold three or four washing pans; this will answer well at the same time for pinning the paper to while drying. A small shelf near the table will also be a convenience as a resting place for the bottles containing the chemicals: this enables the table to be kept quite clear and fit for action, which will be found a great advantage, and will tend much to the success of the various processes.

A pan of clean water and some clean cloths may be advantageously placed near at hand, as likewise vessels for the refuse, waters and liquids, used in the production of pictures.

The cloths and leathers used in the Collodion process ought to be hung on separate hooks, so as to be kept quite distinct and within reach, and each one should be returned to its place when done with.

The solutions in all the processes require frequently to be filtered; and it may be of service to the novice to describe the way of folding the bibulous paper to be used in the operation. Cut a circle of the paper of twice the diameter of the funnel to be used, and first fold it in half and then in quarter; it will now be found to fit the funnel exactly. The paper is folded in precisely the same way when used with the filter ring.

These remarks will no doubt appear quite unnecessary to many Photographers now adepts in the art, but I would merely remind them that it has been by attention to minute and apparently trivial matters that they have attained their present proficiency.

THE COLLODION PROCESS.

In the year 1851 Mr. Scott Archer made known to the world a process by which he had succeeded in taking impressions in the Camera on a film of collodion spread upon a plate of glass.

His process varied very little from that now most recommended, except in a few particulars of manipulation, which practice has shown to be essential to success.

The advantages of such a process had been long admitted, but up to this point nothing of great service had been proposed except that on Albumenized Glass, which, from the slowness of its action, was useless for portraiture, and almost so for many other purposes.

The transparency of glass plates, and the film of collodion, as compared with the uneven texture of paper, is a strong argument in its favour; but when we superadd the extreme sensitiveness of the collodion plate, and the ease in the manipulation, nothing more can be desired for obtaining perfect representations of natural objects.

Collodion is a solution of gun-cotton in sulphuric æther, and the qualities that fit it for Photographic purposes are, capability of being rendered extremely sensitive to light, toughness, tenacity, and freedom from impurities of any kind.

These objects will be attained by following the method we are about to describe in all its details, the principal points requiring attention being the strength of the various chemical preparations, and the space of time the cotton is exposed to the action of the acid. The mode of proceeding is as follows:—

Take ½ lb. of purified nitrate of potash in powder and throw it into an evaporating dish placed in any convenient manner under a chimney or in the open air; next weigh ½ oz. of best carded cotton perfectly free from impurities, and having pulled out the fibres place it near at hand. Then add to the nitrate of potash 9 oz. by measure of sulphuric acid of the specific gravity 1860, and having thoroughly mixed them with two stout glass rods, add in portions at a time the carded cotton, taking care that every fibre is brought in contact with the nitric acid which is being disengaged. The cotton, which assumes a sort of pulpy consistence, must now be kneaded with the glass rods for the space of five minutes, taking care that during the whole operation the cotton is entirely covered with the acid. This precaution is necessary, and forms one of the principal points to be attended to in the manufacture, because if the cotton become exposed to the action of the air, or if any air become enclosed in the interstices of the cotton, it not only protects the fibres from the action of the nitric acid, but causes a great and rapid disengagement of nitrous fumes, which have a very prejudicial effect on the solubility of the cotton produced. After being submitted to the above operation for five minutes, the cotton is to be removed quickly to a large vessel of cold water in order to dissolve the adherent sulphate of potash, and to clear it of any sulphuric acid that has not been used in the process. This washing is best accomplished in practice by placing the cotton after its removal from the first pan of water in a shallow trough, so constructed that a stream of cold water may constantly flow through it and carry away all soluble matter. When the cotton on being tested with blue litmus paper ceases to give a red tinge, it may be transferred to a pan of distilled water and allowed to soak for an hour or two, in order further to free it from any impurity. It is then to be pressed to separate the water, and spread out in a warm place exposed to a current of air to dry.

It is necessary in the above operations to be quite prepared with all the materials and appliances close at hand, otherwise a greater portion of the nitric acid formed will have escaped in vapour before the cotton can be brought in contact with it; and also, if time be lost in the transference of the cotton to the washing pan, a deterioration will take place in its quality.

Should the operator find that, from the action of air enclosed in the cotton, the nitrous fumes are beginning to arise, which may easily be ascertained by a peculiar hissing sound emanating from the compound owing to the disengagement of the gas, he must lose no time in changing the position of the cotton in order to bring the acid in contact with the part of the mass in question.

By following the above directions carefully any one can ensure making a cotton that shall be perfectly soluble, and one that will give the essentials of toughness and tenacity to the collodion made with it.

The next part of the process is to bring the cotton prepared as above to a state of solution. This is accomplished in the following manner:—

Place 100 grains of the prepared cotton in a one pint bottle, and pour on to it 10 drachms of alcohol of the specific gravity ·840. Agitate so as to saturate the cotton with the alcohol, and then add 18 oz. by measure of sulphuric æther, of specific gravity ·745. Agitation must be kept up until the whole of the cotton is dissolved, which will be in three or four minutes if it has been properly prepared in the first instance. The bottle containing the above is now to be set aside to allow the collodion to clear, which it will do in the course of 36 hours by the deposition of some of the fine fibres of the cotton that are insoluble in the æther.

The reason of adding alcohol to the cotton before dissolving in the æther is, that it may be taken up more readily; for if we treat the cotton with very strong æther it will not be dissolved, but immediately on the addition of a small quantity of alcohol it is entirely taken up.

Having thus far prepared our collodion and drawn it off from the sediment in the bottle, the next point to which we have to turn our attention is to impregnate it with some soluble iodide,—in fact, to iodize it.

Many methods to effect this object have been published from time to time, each, according to the discoverer, possessing advantages above all others. We may here enumerate a few of the plans, beginning with Archer's, which consists in saturating alcohol with iodide of potassium, and agitating with this, newly precipitated iodide of silver, until no more is taken up: the liquid is allowed to settle and then decanted. 5 drops of this solution are to be added to each ounce of collodion.

The Count de Montizon recommends, as giving good half tones to the pictures, 2 grains of iodide of ammonium to be added to each ounce of collodion.

Another recipe of the same photographer indicates 8 grains of iodide of potassium, 4 grains of iodide of ammonium, and ½ a grain of iodide of silver, dissolved in 8 drachms of alcohol. This quantity is to be added to 3 ounces of collodion.

Brebisson advises the use of alcoholic solution of iodide of silver in iodide of potassium, formed in the same manner as Archer's, with an alcoholic solution of iodide of iron. The proportions are—

Collodion	50	grammes.
Alcoholic solution of iodide of silver,	15	do.
Do. do. do. iron,	6	do.

I have merely enumerated the above methods in order to show what diversity there exists in the means of accomplishing the same object. The plan which after long experience appears to me to answer best for iodizing collodion, and one which is liable to fewer objections and accidents than any proposed above, is simply to dissolve 4 grains of iodide of potassium in 2 drachms of alcohol, of the specific gravity ·840, and after filtration add this quantity to 8 drachms of collodion, prepared as before directed. It will be found that the addition of 10 minims of chloroform to the collodion thus iodized will add much to its sensitiveness.

Collodion iodized in this manner will be found to give excellent half-tones, and at the same time very vigorous blacks to the picture. Another advantage in the use of iodide of potassium is, that it is less readily decomposed than the iodide of ammonium; and further, that it does not injure the bath, which is the case with the latter salt.

We have now an iodized collodion, composed as follows:—

Soluble cotton . .	5 grains	Collodion.
Alcohol . . .	½ drachm	
Sulphuric æther .	7½ do.	
Iodide of potassium .	4 grains	Iodizing solution.
Alcohol . . .	2 drachms	
Chloroform . .	10 minims	

Before entering upon the details of manipulation in the Collodion process, it may not be out of place to give some account of the chemical substances used in Photography, and also to make a few remarks on their behaviour under certain conditions.

The following list contains the usual chemical preparations concerned in the formation of the Photographic image:

Iodide of potassium.
Nitrate of silver.
Gallic acid.
Pyrogallic acid.
Acetic acid.
Proto-sulphate of iron.
Hypo-sulphite of soda.

To commence then with IODIDE OF POTASSIUM. This salt, consisting of iodine combined with the metal potassium, is formed by saturating a hot solution of pure potassa with iodine, which gives rise to iodide of potassium and iodate of potash. This is evaporated to dryness and exposed to a gentle red heat in a platinum crucible in order to decompose the iodate. The fused mass is then dissolved in water and crystallized.

The photographer should be particularly careful in the purchase of this salt, as it is frequently contaminated with various impurities which render it perfectly useless in Photography. The most usual contaminations are chloride of potassium, and carbonate and sulphate of potassa, either of which would have an injurious effect on its qualities.

Pure iodide of potassium is in crystals of the cubic form, white and opaque, that do not deliquesce in a moderately dry atmosphere, and are perfectly soluble in absolute alcohol.

NITRATE OF SILVER is formed by dissolving pure silver in nitric acid diluted with three times its bulk of water: the solution is evaporated, and crystals of nitrate of silver are deposited in the form of transparent tables on the cooling of the liquid. These are dissolved in water and again crystallized, in order to free them from any adhering nitric acid.

Nitrate of silver is met with in commerce in two states, one in the form of crystals, as just described, and the other in small cylindrical sticks; these latter should be rejected by the photographer, as containing many impurities and contaminations which are not found in the crystallized article. The foreign matters found in the nitrate of silver of commerce are, lead, copper, and potash, each in the state of nitrate. The whole of these impurities are detrimental to the paper action of the nitrate of silver in the various Photographic processes.

GALLIC ACID.—If powdered Aleppo galls be mixed with water to the consistency of a thin paste, and exposed to the action of the atmosphere at a temperature of 65° for a period of four or five weeks, the evaporation being neutralized by the addition of small quantities of water, they will become mouldy: the liquid is then pressed out and the residue boiled in water. The resulting hot solution must now be filtered, and as it cools will deposit beautiful crystals of gallic acid; these are to be boiled in water with some animal charcoal, and the solution again filtered, when on cooling the gallic acid will crystallize in the form of slender needles, having a silky lustre. The gallic acid should be of a light yellow colour, and perfectly free from dark portions; and when dissolved should make a bright and clear solution. 1 oz. of water will dissolve about 4 grs. of gallic acid at the temperature of 60°.

PYROGALLIC ACID.—This beautiful substance is obtained by submitting gallic acid in suitable apparatus to a temperature of 430° Fah., when pyrogallic acid in the form of bright shining scales sublimes and is condensed in the upper part of the vessel.

The scales ought to be quite white and free from any tinge of brown, otherwise we may conclude that they have become contaminated with an empyreumatic oil, and that the temperature at which they have been formed was too high.

The only other impurity likely to be discovered in pyrogallic acid is metagallic acid, which is produced from the same cause as the oil mentioned above. The first impurity causes the pyrogallic acid, when mixed ready for developing the picture, to decompose more readily; and the second, if not carefully separated by filtration, causes innumerable blemishes on the surface of the plate.

ACETIC ACID (glacial) is the result of the decomposition of acetate of soda, which has been thoroughly purified by repeated crystallizations, by sulphuric acid; the acetic acid distilling over at a temperature of 125°. The first product is then re-distilled over some dry acetate of soda, and the product submitted to the action of cold until it assumes the solid form; the liquid is then drained from the crystals, which are pure hydrated acetic acid.

There are various impurities in the ordinary strong acetic acid, such as sulphuric, tartaric, oxalic, and hydrochloric acids; but if the article be carefully prepared, we need not be apprehensive of any contamination. It is above all things necessary that the acetic acid should be of good quality, as so much of the brilliancy and clearness of the pictures produced with it depend on its purity and strength.

PROTO-SULPHATE OF IRON.—This salt is obtained by treating metallic iron with dilute sulphuric acid, the liquid on evaporation yielding crystals of a bluish green colour, which after being dissolved and re-crystallized form the pure proto-sulphate of iron. The only impurity of consequence in this salt is due to the peroxidation of part of the base; this, however, may be easily detected by the crystals becoming slightly tinged with yellow. Any indication of the kind in a sample ought to be sufficient grounds for its rejection by the photographer.

HYPO-SULPHITE OF SODA.—There are various ways in which this salt can be made; the following appears to be the most simple:—

Mix 1 lb. of finely pulverized calcined carbonate of soda with

10 oz. of flowers of sulphur; heat the mixture slowly till the sulphur melts; stir the fused mass so as to expose all its parts freely to the atmosphere; then dissolve in water, filter the solution, and boil it immediately with flowers of sulphur. On cooling, after being filtered, it will deposit beautiful crystals of the hypo-sulphite of soda. The only impurity likely to interfere with the photographic use of hypo-sulphite, is the sulphate of soda; but this may be easily detected by the crystals looking dry instead of slightly damp.

From the foregoing remarks it will be seen how necessary it is to be careful in the selection of the chemicals we are about to use; and I venture to assert that more failures have arisen from inattention to this particular than from any other cause.

SOLUTIONS REQUIRED IN THE COLLODION PROCESS.

The nitrate of silver bath is compounded in the following manner:—

Nitrate of silver, in crystals . .	600 grains.
Distilled water	20 ounces.
Iodide of silver, recently precipitated .	20 grains.

Allow the bottle containing this mixture to remain in a warm place for a few hours, and then filter it for use.

DEVELOPING SOLUTIONS.

For Negatives.—The solution which I have found to give the best results is composed of pyrogallic and acetic acids and water, in the proportions indicated below:—

Pyrogallic acid	3 grains.
Acetic acid (glacial)	1 drachm.
Water (distilled)	2 ounces.

Dissolve and filter carefully.

For Positives.—There have been a vast number of different preparations recommended for the purpose of producing positive pictures on the collodion plate. The formula which is here adopted, and with which I have obtained the most satisfactory pictures, is a combination of proto-sulphate of iron with acetic and nitric acids. The proportions are the following:—

Proto-sulphate of iron, in crystals .	3 drachms.
Water (distilled)	4 ounces.
Acetic acid	2 drachms.
Nitric acid	15 drops.

To be added immediately before use.

This developing agent will be found to possess many advantages. It reduces the silver of a most pleasing colour, obviating the unpleasant whiteness which is often a great drawback to these beautiful pictures. The iron solution will keep for some time, but the pyrogallic acid solution will not remain good for more than two or three days at the utmost when quite excluded from the light.

FIXING SOLUTION.—This consists simply of a saturated solution of hypo-sulphite of soda in water. There is no occasion for the water to be distilled, it may be merely filtered to free it from gross impurities.

The apparatus required for the Collodion process is of a very simple kind, and consists of the subjoined articles:—

Gutta-percha bath, for holding the nitrate of silver.

The dipper, which consists of a strip of flat glass, having a small support cemented at one extremity for the purpose of holding the glass plate while it is being plunged into the bath.

Levelling stand, with proper adjusting screws for supporting the plate, while the picture is being either developed or fixed.

2 ounce measure.

1 ounce ditto, for developing solution.

Small-spouted cup, for hypo-sulphite of soda.

Funnel, and filter ring; the former for the filtration of the bath, the latter for the purpose of filtering small quantities of developing solution before use.

Porcelain pan, to hold the levelling stand in order to catch the superfluous liquid.

Having thus described the manner of making the Collodion, and the points to be attended to in the preparation of the solutions for the process, we shall now proceed to give as detailed and simple account as possible of the manipulatory part of the process; and let me here impress particularly on the mind of the novice in such matters, that next to pure chemicals, cleanliness is of the highest importance, and that he cannot hope for success unless great attention be paid to this particular.

The manipulation is divided into seven distinct operations, viz., cleaning the plate, spreading the collodion film, exciting the plate or rendering it sensitive, exposure to the action of light, development of the image, fixing the proof, and finally varnishing the picture to prevent injury to the surface while taking the positive on paper.

CLEANING THE PLATE.

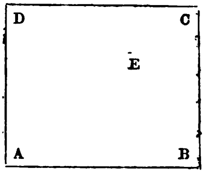
The plate, which should be ground at the edges, is to be thoroughly washed in abundance of water, dried on clean linen cloths, and finished by being rubbed with a piece of perfectly clean wash leather, one that has been passed through several clean waters to free it from the dressing that exists in it at the time of purchasing.

There is no occasion whatever for the use of nitric acid, potash, soda, or ammonia; all of these substances increase the chances of accident, without giving a corresponding equivalent in their cleaning qualities.

The plate being thoroughly clean, we proceed to the second operation.

SPREADING THE FILM.

This is best accomplished in the manner following:—Hold the plate by the corner (A) between the thumb and forefinger of the left hand, and having previously freed the collodion bottle from any particles of dry collodion which may be adhering to it, pour a good quantity of the collodion on the plate at about the point (E),



then by gently tilting the plate firstly towards the corner (C), secondly to (D), then to (A), taking care that the collodion does not touch the thumb, and lastly to (B); we shall find the plate perfectly covered with the film, and the superfluous quantity in the best position for returning to the bottle, which being done, the plate is still to be kept slightly inclined so that the corner (B) may be lowest; and the lip of the bottle is to be drawn gradually in contact with the edge of the glass from (B) to (A), in order to correct in a great measure the tendency which the collodion has to form streaks across the glass plate: this it accomplishes by laying hold as it were of the film, and shifting its position slightly on the surface of the glass. The operation of coating the plate ought to be performed as quickly as possible, as the evaporation which takes place from such an extended surface of collodion gives rise to the loss of so much æther as to render the collodion returned from the plate almost useless, if the operation be delayed beyond a certain time.

RENDERING THE PLATE SENSITIVE.

As soon as the collodion film has become set, the plate is to be placed on the dipper, and immediately plunged into the nitrate of silver bath—this must be done at one stroke: there must be no stoppage during its descent into the bath; otherwise, wherever such pause has taken place there would be a line on the picture, which would give evidence of its existence in the subsequent processes.

After leaving the plate immersed for about half a minute, withdraw it carefully;—the surface will have changed its aspect, and become of a yellowish colour, and will furthermore be covered with streaks, just as if the plate had been previously oiled. It must be immediately returned to the bath, and moved once or twice briskly up and down at intervals through the space of two minutes when the thermometer is at about 60° Fah., but if lower, longer time may be allowed in the bath. It will be found on removal that the whole of what is technically called greasiness is gone off, and that the liquid flows quite freely over the surface.

The plate is now removed from the bath, and held with one corner downwards to drain for a moment or so: it is then ready for placing in the dark frame of the camera.

Great difficulty, I am fully aware, is experienced by beginners, in knowing how long the plate, after having the collodion poured on to it, ought to remain before immersion in the bath. This difficulty, like many others, will vanish in a very short time, if proper attention be devoted to the appearance of the film under different circumstances. For instance, if the operator find that it takes some considerable time before the film becomes of an opalescent hue, he may safely conclude that the plate has remained out of the bath for too long a time; if, on the contrary, there is any tendency of the iodide of silver formed on the plate immediately on its immersion in the bath, to wash off—as is not unfrequently the case, especially at one of the corners—he may assuredly predict that the collodion had not become set, and that in future operations with that collodion, he must allow a longer period to elapse before immersing it in the bath. A very few experiments will suffice to show the truth of these remarks, and also the necessity for great caution in manipulation. It must always be remembered, after we have been working from one bottle of collodion for any length of time, that the æther has considerably diminished in quantity, in proportion to the alcohol present in the collodion; so that we shall have to defer the immersion of the plate in the bath, in proportion to the amount of exposure the collodion has had in our previous operations. This may appear to many a point of minor importance, but it is scarcely credible the stumbling-block this is in the path of the inexperienced.

Another difficulty experienced by the uninitiated is, the length of time that the plate should remain under the action of the bath, in order to give it the greatest amount of sensitiveness. This varies with the temperature, and appears to be entirely dependent upon it; but it will be found that at the temperature of 60° Fah., two minutes is quite sufficient to render the film sensitive. If, as stated before, the thermometer falls below 50° Fah., longer time —say from three to four minutes—must be allowed to elapse before the final removal of the plate from the bath; but, on the contrary, if the temperature be considerably above 60°, as in the height of summer, the time of immersion must be curtailed in proportion.

Having pointed out these difficulties, and also indicated a way to surmount them, we must leave it to the industry and judgment of the operator to prevent their recurrence, and consider that he has prepared his plate ready for the next step in the process—

EXPOSURE IN THE CAMERA.

This is a point of the greatest nicety, and one which taxes the judgment of experienced operators very severely, especially in a climate like ours, where there is a continual variation in the intensity of the light.

In the case of a portrait, the sitter ought to be so placed that he may be well and equably illumined, taking care that the eyes are protected by blinds, or some contrivance, from any great glare of light, which would inevitably give a false expression to the face, and consequently spoil the likeness. The aspect best adapted for the purpose is the northern, which, of course, is free from the glare complained of, and at the same time reflects light of superior photographic quality.

Care should be taken that the sitter does not move during the operation: this is best accomplished by having the chair furnished at its back with a head-rest, which will prevent the nervous jerk we are so apt to give when sitting in one posture for a few moments together.

The figure being posed to our satisfaction, it is necessary to bring the image to a focus on the ground glass of the camera, and this should be done carefully, as much of the success depends on its proper adjustment.

We now proceed to expose the plate to the action of the light passing through the lens. The precise time of exposure must depend entirely on the judgment of the operator; all we can do in the matter is, to give such general directions as may assist in forming it, and we cannot do better than by instancing cases of *under-exposure* and *over-exposure.* If we find on developing the image that the parts of the picture which were in the best light—such as the forehead, the shirt-front, &c.—make their appearance with some difficulty, and that the parts not so well illumined fail to be at all perceptible, we may conclude that the plate has been under-exposed; but if, on the contrary, the parts that were in comparative shadow are developed as soon as the high lights, we shall find that too long an exposure has been given to the sensitive plate.

The way in which a picture develops itself that has undergone the right amount of exposure is—first, the shirt-front appears; next, the forehead and the light side of the face; then the parts which are not so well illumined; and lastly, the deep shadows become developed.

It is a curious fact, that a picture that has been over-exposed, instead of being extremely dense, as we should naturally expect, loses its vigour in a remarkable degree. While we are viewing it by reflected light, it appears a most solid and vigorous proof; but on holding it between the eye and the light, we shall at once find that the high lights of the picture are scarcely more dense than the background; and instead of a picture that would give a good positive on paper, we shall have one that will scarcely bear printing at all.

We must suppose that the plate has been exposed properly in the camera, and that we are about to

DEVELOP THE PICTURE.

In order to do this, we remove it carefully from the dark slide, and place it face upwards on the levelling stand, which has been previously adjusted by means of the screws mentioned before. We now prepare the solution by placing in the small measure, for the 5in. by 4in. plate, 10 drops of nitrate of silver solution, of the strength of 50 grains to the ounce, adding thereto 4 drachms of the developing solution for negatives, described at page 13. This mixture is then to be poured over the plate as quickly as possible, so as to bring every part under its influence as soon as practicable. As this is a point of some nicety in the manipulation, it may be as well to endeavour to describe as accurately as we can the mode of procedure. Take the measure in the right hand, and beginning at the right hand corner nearest to you, pour on the solution, giving the hand while performing the operation somewhat the motion that would be required for throwing a quoit: this must not be done too quickly nor with too great force, otherwise stains will appear on the plate at that point where we first poured on the developing solution. The reason of this is, evidently, the forcible removal of the film of nitrate of silver still adhering to the plate after its immersion in the bath when being rendered sensitive.

The picture will begin now to appear: the high lights will first come out, then the half-tints, and lastly, the deeper shadows.

During the time that all this is taking place, it is necessary to keep the fluid in motion, in order that the action may be more equal all over the plate. This is best accomplished by gently blowing on the surface in different parts, taking care that it is so gently done that no part of the plate is left dry for any time, no matter however short. It can be ascertained when the picture is sufficiently developed, by simply holding a piece of white paper underneath the glass plate in such a manner that the light reflected from it may traverse the impression. If the operation has been continued sufficiently long, the dark parts will have an intensity according to the exposure, and the parts where the light has not acted will be perfectly transparent and clear; but if, on the contrary, the plate has been subjected to too long an action of the developing solution, the parts that ought to be clear will present a muddy appearance, and there will be a deposit of silver in a minute state of division all over the plate; and further, there will not be that fine variety in the half-tones which characterize a good and successful negative.

THE FIXING PROCESS.

Having poured off the developing solution, the plate is to be washed in a gentle stream of water, and being replaced on the levelling stand, a quantity of hypo-sulphite of soda (page 14) is to be poured over it, and allowed to remain on until the whole of the yellow iodide of the parts unacted upon by light, is entirely dissolved. When this effect, which is readily perceived, is brought about, the plate must be washed in abundance of water, poured very gently over it. Care is required in this operation to prevent the film from being broken, and also from being washed off. The former mishap may be prevented by pouring the water over the plate from a very small elevation, and the latter by not allowing the stream to play on any part of the film that is not attached to the extreme edges of the glass plate.

Positive Pictures on Glass.—If it be required to take a positive on the plate instead of a negative, the operation will be found slightly different in detail, though not so in principle. Thus, to obtain good positives we must leave the plate on which the collodion film has been spread somewhat less time in the nitrate of silver bath, say two-thirds as long as when we desire a negative. And again, the time of exposure in the camera is to be considerably shorter, the precise limit depending on the nature of object and quality of light; from one to three seconds will generally be sufficient in fine weather.

The developing solution for positives (page 14) is to be poured on in the same way as before described for negatives; but it must not be allowed to remain on until it becomes discoloured, otherwise the plate will be stained.

The action of the positive developing solution is very rapid, so that great care is required in treating the plate with it; the object ought to be to cover the surface as quickly as possible without disturbing the film of nitrate of silver adhering to the collodion side of the plate. Inattention to this particular will lead to many failures.

The positives are fixed in the same manner as the negatives.

We have a means of detecting whether we have under or over-exposed our plate as certain with positives as with negatives.

If the plate has been under-exposed it will present the following peculiarities when subjected to the action of the developing solution:—

The high lights will come out with great rapidity, and perhaps a faint trace of the second tints will make its appearance after some moments, but we shall fail to perceive anything of the shadowy part of the picture. Over-exposure of the picture will manifest itself in the reverse way; the whole or nearly all of the image will be developed together, the high lights assuming undue prominence; and further, after the treatment with hypo-sulphite of soda and subsequent washing, there will be an absence of half-tint in the light portions of the picture; and in the instance of a portrait the face will appear almost flat, the features scarcely being distinguishable owing to the blending of the lights of the picture with the shadows. The reason is obvious: the shadows which ordinarily possess but little depth have been exposed to too long an action, and have become nearly as forcible as the high lights, which in their turn are incapable of attaining any greater brilliancy, no matter how long exposed to the solar radiations; consequently we lose the contrast, and obtain only a flat map instead of a human face.

The picture which will follow the application of the developing agent, if the operator has been happy in the judgment of his time, will present none of those irregularities mentioned above; but on the contrary, the high lights, as a matter of course, will be the first to appear; then the half tones, visibly inferior in strength; and lastly, the shadowy parts will be faintly visible. When this point is reached the solution must be thrown off the plate, and a plentiful supply of water run over its surface before the application of the hypo-sulphite of soda, in order to prevent the deposition of sulphur on the reduced silver of the picture, which would inevitably take place from the action of the acid in the developing solution.

It is most beautiful and interesting to notice the mist as it were gradually being dispelled by the hypo-sulphite, and the brilliant pictures stand out in bold relief against the background. Photographically speaking, I know of no greater pleasure than to see a successful picture gradually making its appearance from the clouds that have enveloped it up to this point: it well repays you for many failures and vexations in the earlier part of your photographic career.

VARNISHING THE PLATE.

Before we can print with safety from the negatives obtained by the collodion process, it is necessary to protect the film from injury, and at the same time to take care that the varnish that we use possesses the qualities of transparency and hardness. The varnish I employ is composed of gums dissolved in alcohol, and the best mode of applying it is to warm the plate gently by the fire to prevent it from becoming chilled; then pour on the varnish in the same manner as recommended while treating of the collodion film, returning the superfluous quantity to the bottle. A fragment of blotting paper is to be passed along the edge of the glass where the varnish has become thickened, in order to remove the same. On holding the varnished side of the plate to the fire for two or three minutes the varnish will become quite dry, and when cold will be perfectly hard.

The precautions necessary in the varnishing process are, first, not to make the plate too hot before coating it with varnish, as this causes it to crack at some subsequent period; second, not to allow the plate to get cool before the varnish is quite dry, otherwise, instead of a beautifully hard transparent film, we shall have one nearly opaque and of a granular appearance, owing to the varnish having become chilled. If the varnishing operation has been skilfully conducted, there is a great difficulty in determining on which side of the glass the picture has been formed, without referring to the corner by which the plate has been held.

For positives, the surface of the collodion must be varnished precisely as directed above; and when dry the plate is to be again hours, at the end of which time the froth will have subsided, and have drained as a clear liquid into the bottle placed under the funnel to receive it.

SPREADING THE ALBUMEN ON THE GLASS PLATE.

This is best accomplished, after having first cleaned the plate with a weak solution of soda in water, and then thoroughly washed and dried it, by suspending the plate by two of its opposite corners, in a pair of wire forceps* made for the purpose,—then, having fastened a piece of worsted to the upper angle of the same, pour on to the centre of the suspended plate sufficient of the iodized albumen, so that by gently twisting the worsted support it may cover it, the superfluous quantity being returned to the bottle by one of the corners. The plate must then be quickly restored to the horizontal position, and taken in front of a bright fire, the worsted thread being at the same time gently twisted so as to give it a rotatory motion,—the motion must be nicely regulated, for if too slow, the film dries unequally, and if too quick, the liquid albumen is driven off at the edges by centrifugal force; about three or four minutes will generally be sufficient time for exposure to the heat, the signal for removal being the cracking of the film at the edges of the plate; when this effect is produced the plate must be immediately removed, and when the film has cracked equally all over, it is ready to be rendered sensitive, and will keep in this state for any length of time.

RENDERING THE PLATE SENSITIVE.

The following formula will be found to give the best results:—

Nitrate of silver	50 grains	Aceto-nitrate of silver
Glacial acetic acid	2 drachms	
Distilled water	1 ounce	

The operation of rendering the plate sensitive is performed by pouring some of the above solution into a shallow glass dish, to the depth of ¼ of an inch, and then placing quickly the prepared side of the plate in contact with it. This is best effected by resting one end of the plate quite in the bottom corner of one side of the dish, and then dexterously allowing it quickly to drop down on to the fluid, taking care that no air bubbles intervene. The plate should be allowed to rest in this position for the space of two minutes, when it is to be carefully raised, and removed to a dish of distilled water, there to be agitated for two or three minutes; it may now be stood on end in a warm place to dry, or be placed immediately in the dark frame, to await the exposure in the camera.

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* First proposed by Messrs. Ross and Thompson, of Edinburgh.

EXPOSURE IN THE CAMERA.

In this matter, experience is the only guide that can be depended upon; all that we can offer to the reader, is what experiment has shown to be the limits of time between which the plate, as prepared above, may be submitted to the solar radiations with success. The exact time of exposure must depend on the nature of the object, the position of the sun, and the temperature of the air. In a good light, with a temperature of 60°, from 5 to 6 minutes will be quite sufficient, where the view is of a moderately light colour, such as a stone building, *cathedral*, &c. &c.; but if a landscape be the object we desire, then a much longer time—say, from 20 minutes to 30 minutes—will not overdo the picture. A very few trials will, however, do more in forming the judgment of the operator in this particular than pages of directions, which can only be framed from cases that may only have occurred to the author.

DEVELOPING THE LATENT IMAGE.

On removing the plate from the camera, it is to be placed on a levelling stand, such as recommended for the Collodion process (page 14), and treated with a saturated solution of gallic acid,—the picture will soon make its appearance, if it has had the right exposure. When the image is quite developed, but of rather a faint colour, a small quantity of gallic acid and aceto-nitrate of silver, in equal proportions, is to be poured evenly over it,—this will deepen the tones, and give force and vigour to the whole picture; when this point is attained, and the impression is sufficiently dark, the developing solution is to be thrown off, and a quantity of water poured over the surface to fit it, for the process of

FIXING THE PICTURE,

Which consists in pouring on to the plate a saturated solution of hypo-sulphite of soda, and leaving it there till all the yellow colour disappears—washing the picture thus fixed with abundance of water, and subsequent drying of the plate, concludes the process of obtaining a negative on glass by means of a film of albumen.

These negatives may be printed from without being varnished, if a little care be taken that their surfaces are not allowed to come in contact with any grit, so that they become scratched. The exquisite detail of Albumen pictures forms one very great recommendation for the adoption of the process. Another advantage is, that the plates can be used in the dry state, and after being excited for several days. The only drawback appears to be, the length of exposure in the camera, and the tardy development of the photographic image, after having undergone the solar influence.

PAPER PROCESSES.

THE CALOTYPE OR TALBOTYPE.

The process—a modification of which we are now about to describe—was the subject of a patent granted to Mr. Fox Talbot, from whose name the second title of this paper is derived. It consists essentially of the production of pictures on iodized paper, by means of nitrate of silver and gallic acid. It is impossible, however, to obtain a successful picture by Mr. Fox Talbot's method as laid down in his specification, and it has been found necessary so to modify the plan of procedure, that it almost assumes the form of a new process.

The material on which we have to work is paper, and every care and attention ought to be directed to the selection of such samples as present the greatest uniformity of texture and evenness of surface, combined with transparency, and freedom from gross blemishes—such as iron or brass spots, &c.

APPARATUS REQUIRED IN THE CALOTYPE PROCESS.

Soft wood board.
Glass rod.
Funnel.
1 oz. measure.
Minim ditto.
Pins.

SOLUTIONS REQUIRED IN THE CALOTYPE PROCESS.

FIRST PROCESS.

Iodide of silver	30 grains.
Water (distilled)	1 ounce.

Iodide of potassium, to dissolve iodide of silver.

Nitrate of silver	50 grains.
Water (distilled)	1 ounce.

Glacial acetic acid.

Saturated solution of gallic acid.

Hypo-sulphite of soda . . .	4 ounces.
Water	1 pint.

SECOND PROCESS.

Iodide of potassium	20 grains.
Water (distilled)	1 ounce.

Nitrate of silver	30 grains.
Water (distilled)	1 ounce.
Glacial acetic acid . . .	2 drachms.

Saturated solution of gallic acid.

Hypo-sulphite of soda . . .	4 ounces.
Water	1 pint.

There are two processes by which the author has succeeded in obtaining most excellent results, and he now purposes to give such plain and simple directions in both of them, that if followed, carefully and in detail, by the merest tyro in the art, must lead him to success.

The first process separates itself into the following divisions:—

Iodizing the paper.
Rendering the paper sensitive.
Exposure in the camera.
Development of the image; and
Fixing the picture.

TO IODIZE THE PAPER.

Make a solution as follows—

Nitrate of silver	30 grains.
Distilled water	1 ounce.

Add to this a solution of 30 grains of iodide of potassium in 1 ounce of water: a brilliant yellow precipitate will be the result. Allow this to settle, pour off the supernatant liquid, and treat the precipitate with a fresh 2 ounces of distilled water; let it rest once more, and again decant the clear liquid remaining above the powder. Now pour 1 ounce of distilled water on to the iodide of silver thus formed, and add one crystal at a time of iodide of potassium (continually stirring with a glass rod) until the whole of the precipitate is dissolved; the liquid may now be filtered through blotting paper, and preserved in a well-stoppered bottle for use. This solution is technically called "Double iodide of silver."

The paper best suited for the Calotype is that manufactured by "Turner, of Chafford Mill," or that by "Whatman, of Turkey Mill." Either of them allow of good pictures being produced on them.

Having selected a sheet of paper, as free as possible from blemishes of any kind, pin it by two of its corners to a soft wood board, and, laying it flat on a table, place a glass rod along its upper end, next the pins that retain the paper, holding it with the right hand; then with the left hand pour some of the double iodide of silver immediately in front of the glass rod, and move the same down the sheet of paper in such a manner that the liquid may follow the rod, and give an even coating. If this be not accomplished the first time the rod is passed over the surface, a repetition of the movement will generally secure this end. Care must be taken not to press too much on the rod, otherwise the surface of the paper is liable to become injured.

The paper being thus coated with an even layer of "Double iodide of silver," is to be removed from the board, and hung up to any convenient support, to become *surface dry*. It is then to be placed very carefully, prepared side downwards, on to the surface of water contained in a porcelain pan, and allowed to remain in contact with it for ten minutes. It is then to be removed to another pan of water, and to be totally immersed in it for the space of ten minutes more; and, finally, it is plunged into a large pan of water, and there soaked for fifteen minutes, from which it is cautiously taken out, and hung up to dry spontaneously.

Care is required in floating the paper on the first bath, in order to prevent the intervention of air-bubbles between the surfaces of the water and paper. The best way of obviating this difficulty is, to take the sheet of paper, one end in the right and the other in the left hand, and bending it into the shape of the letter U with the coated side outwards, place the middle of the letter in contact with the water, and gradually lower the ends of the paper on to the surface of that fluid. The paper being quite dry, will present a beautiful primrose tint, and is ready for the next operation, which is

RENDERING THE PAPER SENSITIVE.

The solutions required for this purpose are the following:—

Nitrate of silver	50 grains.
Distilled water	1 ounce.
Gallic acid . . .	saturated solution.
Glacial acetic acid.	

And the sensitive solution applied to the iodized paper as prepared above, is a mixture of these in the proportions indicated below:—

Distilled water . .	1 drachm	Gallo-nitrate of silver.
Nitrate of silver solution	4 drops	
Solution of gallic acid .	3 drops	
Acetic acid . . .	3 drops	

Thoroughly mix.

This solution is to be applied to the iodized paper in the same manner as the double iodide, as before described, namely, by means of the glass rod. After it has been allowed to remain on the paper for two minutes, the superfluous quantity is to be carefully removed by means of *perfectly clean* bibulous paper, and if not required to be used immediately, can be hung up to dry in a dark place. Paper prepared in this manner will keep good for 24 hours; that is to say, it may be prepared in the evening of one day, and the picture be developed in the evening of the next, without any detriment to its perfection.

We now proceed to the

EXPOSURE IN THE CAMERA.

This part of the process requires attention, and it is only by observation and experience that we can determine the time required under different circumstances. On a moderately bright day, with an average landscape, the time of exposure would vary from five minutes to ten; the exact amount depending on the nature of the objects, and their degree of illumination. In very dull weather, from 15 to 20 minutes may with advantage elapse between opening and closing the lens—but even with this long exposure, pictures are never so satisfactory as when taken on a bright sunny day.

BRINGING OUT THE PICTURE.

The paper when it comes from the dark frame of the camera presents usually an uniform surface, no trace of the picture being visible. It is again pinned to the soft wood board, and by means of the glass rod a saturated solution of gallic acid is spread over it, taking care that the whole of the paper is equally wetted. After a few moments the latent image will begin to unfold itself in a most remarkable and beautiful manner—the sky, as might be supposed, coming out first—then the most highly illumined portions of the picture—and, lastly, the deep shady parts make their appearance. While this is taking place, the rod must frequently be passed over the paper, to equalize the action of the gallic acid, and also to prevent any part of the paper from becoming dry. When all the picture is developed, but is still of a light colour, a few drops of gallo-nitrate of silver may be added, and quickly spread over the paper: this will have the effect of deepening the tone of the impression, and of giving due preponderance and intensity to the dark parts of the negative.

Judgment must be exercised so as not to carry the development too far, otherwise the light parts of the picture suffer, and become charged with a deposit of oxide of silver, which greatly affects the beauty of the positive impressions taken from it in the subsequent part of the process. The degree of development may be ascertained by carefully lifting the picture by one corner, and interposing it between the eye and the light: it will be seen by this means whether the "blacks" of the impression are sufficiently decided and vigorous, and also whether the detail possesses sufficient intensity to give its due effect in the positive.

As there is great latitude in the amount of time we have indicated for the exposure of the paper to the action of light, it may be perhaps of some service to the novice to point out the effects of "under and over-exposure." If the paper, on the one hand, has been too short a time under the influence of the light, it will be some considerable time before any appearance of an image will manifest itself when being treated with gallic acid, and the shadowy parts will with great difficulty come out, even if they do at all; but, on the other hand, if too long an exposure has been given, the picture will be visible on the paper before the application of the gallic acid, and on being subjected to the process of development as before described, will assume a red tinge, instead of the beautiful and intense black, so characteristic of a negative that has undergone the correct time of exposure.

SECOND PROCESS.

This mode of operating presents many advantages over the former, the principal of which are simplicity, ease in the management, absence of necessity for so much washing of the paper, &c.

Before proceeding to describe the exact plan of manipulation, I purpose to indicate what I consider the principles that ought to guide us in the production of a sensitive Calotype paper.

If we precipitate an iodide of silver from a solution of the nitrate, with an excess of iodide of potassium, we obtain a beautiful primrose powder, which, on exposure to light, does not show the slightest alteration in its properties,—clearly indicating that this particular compound of iodine and silver is insensible to the influence of solar radiations.

But if, in a second experiment, we cause a precipitation of iodide of silver from a solution of the nitrate, with a deficiency of iodide of potassium, we shall obtain a different coloured powder, which being spread upon paper, and subjected to solar influence, will at first turn brown, and, gradually deepening in tone, will finally assume a tint verging on black. It is quite clear that this latter compound is different in its behaviour, under the same conditions, to that before described; and, further, that from its mode of preparation, it is of different composition. Now, it is this latter compound (the *sub-iodide of silver*) that it is our endeavour to form on the paper in the Calotype process, previously to its exposure in the camera, and this end will be brought about in the most perfect manner, by the following method of operation:—

PREPARATION OF THE PAPER.

Pin the paper by two of its corners to the soft-wood board, and spread over its surface, by means of the glass-rod (page 30), a solution composed of

Iodide of potassium	20 grains.
Water	1 ounce.

Filter carefully before use.

After the paper is thoroughly covered, allow it to rest for two minutes, and then with a piece of perfectly clean blotting paper absorb the superfluous quantity, so as to leave the paper just surface dry; return it to the board, and having again secured it by means of the pins, repeat the operation with the aceto-nitrate of silver, prepared as follows:—

Crystallized nitrate of silver . .	30 grains.
Distilled water	1 ounce.
Glacial acetic acid	2 drachms.

This solution is also to be suffered to remain on the paper for the space of two minutes, and, after which interval, the outstanding liquid is to be removed by bibulous paper, applied with a very light hand; this latter precaution is necessary in order to prevent the forcible removal of the sub-iodide of silver from the surface of the paper,—an accident of no unfrequent occurrence, if the blotting paper be applied too roughly.

If not required for immediate use, the paper thus iodized and rendered sensitive, may be hung up to dry, or may be placed while still damp in the dark frame, to await the exposure to the action of light in the camera.

Paper prepared by the above formula will, if carefully excluded from the light and air, by being placed between folds of blotting paper, keep good and sensitive for 24 hours.

The plan which the Author has found best, is to prepare the paper early in the morning of the day on which it is to be used, and to develop the picture in the evening of the same day.

EXPOSURE IN THE CAMERA.

The time, as before stated, varies continually with every variation of circumstances, but from 3 to 10 minutes will be found the most usual range under ordinary conditions of light and subject. On removal from the camera, I generally prefer to see a slight trace of the picture,—such as the outline of the landscape against the sky,—this, when attentively observed, will be found a good criterion of the proper length of exposure to the luminous influence.

THE DEVELOPMENT OF THE PICTURE

Is performed by spreading the surface with a saturated solution of gallic acid, by means of the glass rod,—taking special care that the paper be evenly covered, and that no part be allowed to become dry. This treatment is continued until the whole of the details of the picture become apparent, but still of a light colour; at this point, a few drops of aceto-nitrate of silver are to be added, and spread over it as quickly as possible, in order to deepen the tone, and to give vigour to the dark portions of the picture. When the development has been carried sufficiently far, which may be judged of as before directed—by carefully raising one corner of the paper, and viewing the impression by transmitted light—the picture is to be transferred to a pan of clean water, and thence to the

FIXING BATH,

Composed of 4 ounces of hypo-sulphite of soda to 1 pint of water, in which it is to soak for about ten minutes, until the whole of the yellow colour disappears, when another removal to a vessel containing an abundance of water, will, after two hours soaking, complete the operation, of obtaining a negative by this process.

From the remarks made at the commencement of this paper, it will hardly be apparent what part the acetic acid plays in the sensitive solution, but in order that the reader may be acquainted with the rationale of the process more fully, we propose to lay before him the following simple experiment:—

The reason for using the acetic acid in the sensitive solution, is to preserve the lights of the picture,—its mode of action will be seen thus:—

Precipitate some sub-iodide of silver in two test tubes; let one of them be exposed to the light, and the other carefully excluded from it; that exposed will present a slightly altered aspect—it will have become of a light buff colour. If now we add to each of these precipitations a saturated solution of gallic acid, both will *turn nearly* black; that which has been exposed being the first to show the change, the difference being apparently only one of intensity. Such, however, is not the case, for on adding a quantity of glacial acetic acid to each of the tubes, that which had undergone the influence of light will remain unaltered; while that which has been carefully excluded from its action will become clear, and present as pure a surface of yellow iodide of silver as at first; clearly showing that the acetic acid has the power of dissolving the oxide of silver that is let down by the action of the gallic acid, while it fails to disturb the deposit caused by the action of the solar influence.

It will be seen from the above that we have illustrated precisely the conditions that obtain in the Calotype picture, the dark parts retaining their intensity, while the parts which have not been acted upon by the light are preserved in all their integrity by the clearing action of the acetic acid.

WAXING PAPER NEGATIVES.

Negative pictures taken by either of the foregoing processes are much improved in transparency and definition by being saturated with white wax; the best mode of accomplishing which is to lay the picture face downwards on to a piece of blotting paper, and to pass over its back a flat iron that has been heated, at the same time a piece of perfectly pure white wax is to be held in contact with and made to follow the iron; the paper will by this means become impregnated with the wax, but on inspection it will be found that too large a quantity is on the surface; this is to be removed by placing the waxed picture between folds of perfectly clean blotting paper, and again passing a hot iron over the whole; by this operation the wax is again melted and the superfluous quantity absorbed by the super-imposed bibulous paper.

Pictures treated in this manner can be printed from with as much ease, and with almost as satisfactory results, as those taken on glass, the detail being brought out in a remarkable degree, and the wax counteracting to a very great extent the unevenness of texture in the paper which militates so powerfully against the perfection of paper photographs.

THE WAXED PAPER PROCESS.

APPARATUS REQUIRED IN THE WAXED PAPER PROCESS.

Tin dish, for waxing paper.
Argand lamp.
Porcelain pans.
Glass pan.
Horn forceps, for taking paper from baths.
Glass measures
Funnel.

SOLUTIONS REQUIRED FOR THE WAXED PAPER PROCESS.

Iodide of potassium	180 grains.
Bromide of potassium	45 do.
Gum arabic, dissolved in 1 oz. of water	½ ounce.
Re-sublimed iodine	6 grains.
Distilled water	40 ounces.

Filter for use.

Nitrate of silver	40 grains.
Glacial acetic acid	1 drachm.
Distilled water	1 ounce.

Gallic acid	1 drachm.
Water	40 ounces.

Hypo-sulphite of soda	4 ounces.
Water	1 pint.

Much has from time to time been written on this branch of the subject, and many are the plans recommended for obtaining photographic proofs on waxed paper. The following process will, however, be found to possess the great advantage of simplicity, compared with the original one as described by Le Gray, to whom the art is indebted for the invention of this beautiful method of producing sun pictures.

The natural divisions of the process are, 1st, waxing the paper; 2nd, iodizing the same; 3rd, rendering it sensitive; 4th, exposure to the image in the camera; 5th, development of the latent picture; 6th, fixing the proof.

1st. Waxing the paper. The paper most to be preferred for this process is that prepared by Canson frères. It is of a uniform texture and very thin, and is known to the shops as Canson's negative paper. A sheet of this is to be selected free from specks or blemishes of any sort, and treated in the manner following:—

Provide a flat tin dish about half an inch deep, and fit this into an outer one that can contain water, which is to be kept at boiling heat by means of a lamp placed beneath; three or four cakes of the best white wax being placed in the inner vessel and melted, a sheet of the selected paper is to be immersed in it, and allowed to remain in this position until perfectly saturated with the wax. It may then be carefully raised by two of its corners and held over the vessel to drain, after which it is to be hung up to get cold: sheet after sheet may be treated in the same way. When a sufficient number is thus prepared, each sheet is to be placed between folds of blotting paper, and to have a hot iron passed over it; this will cause the wax to be re-melted, and the superfluous quantity absorbed by the blotting paper, thereby giving an uniform transparency to the paper. If all the superfluous wax be not absorbed, the surface of the paper will exhibit patches of undue brilliancy, owing to the outstanding of the wax. The paper when properly prepared should present a perfectly even and uniform surface, and the transparency ought to be without irregularity.

IODIZING THE PAPER.

This is accomplished by immersing the waxed paper in a bath composed as follows:—

180 grains of iodide of potassium.
45 grains of bromide of potassium.
½ ounce gum arabic, dissolved in 1 ounce of water.
6 grains of re-sublimed iodine.
Distilled water 1 quart.

The above is to be filtered into a flat porcelain dish of proper size for the paper, and a number of sheets immersed one after another in it, taking great care that no air bubbles are included between the surfaces of the paper and liquid; they are allowed to remain for one hour and a half, occasionally turning them during the interval, by which time they will have assumed a purple tint owing to the combination of the free iodine with the starch in the glaze of the paper. Careful removal from the bath, and suspension from a convenient support, will complete this stage of operations.

RENDERING THE PAPER SENSITIVE.

The sensitive bath is thus composed:—

40 grains of crystallized nitrate of silver.
1 drachm of glacial acetic acid.
1 ounce of distilled water.

Filter a small quantity of this solution into a flat porcelain dish, as directed for iodizing, and float on to the surface a sheet of the iodized paper; allow it to rest for a few moments until the purple tinge is removed; then turn the sheet, and after waiting three minutes remove it to a pan of distilled water for the space of five minutes, and then to another for five minutes longer, occasionally agitating during the immersion. The paper thus prepared is to be placed between folds of bibulous paper, and finally hung up to dry.

If the above operations have been skilfully carried through, the paper will present an even coating of iodide of silver, and will keep sensitive for ten or twelve days at the least. I have used paper thus prepared after 15 days in cool weather. It should be preserved between leaves of clean blotting paper for use.

EXPOSURE IN THE CAMERA.

The time of exposure, as in all the other processes before described, must depend on various circumstances:—With a 3-inch lens, and a stop of ½-inch diameter, and an ordinary landscape, in bright weather, from 15 to 20 minutes will be found sufficient, but if the weather be very dull, 30 minutes will not overdo the picture; this will convey only an idea of the time required. The correct amount of exposure can alone be determined by experience.

DEVELOPMENT OF THE LATENT PICTURE.

Make a solution of gallic acid in water, of the strength of

Gallic acid	1 drachm.
Water	1 quart.

Filter this into a porcelain pan, and immerse the paper on its removal from the dark slide of the camera, taking care to exclude all air bubbles. The development will soon commence, if the right time of exposure has been given. When nearly all the picture is brought out, remove it from the pan, and add to the gallic acid solution some aceto-nitrate of silver—the same as used for rendering the paper sensitive—in the proportion of ½ a drachm of aceto-nitrate to 4 ounces of gallic acid solution; thoroughly mix and replace the partially developed proof; the details will soon begin to come out, and, at the same time, the dark parts of the picture will gather intensity; the degree of development may be judged of by holding the paper between the eye and the candle, or lamp, by the light of which we are operating. As in the Calotype process, we must guard against over-development, which will cause a deposit in the parts that ought to be transparent, thereby rendering the shadows in the resulting positive thick and muddy, instead of sharp and bright.

A word or two on over and under-exposure of the paper in the camera:—It will be seen from the directions given under that head, that a great latitude is given, because the waxed paper process is essentially rather slow in its results,—if the paper be under-exposed, the image will be a very long time before it makes its appearance, when under the influence of the gallic acid bath,—if, on the contrary, it has been over-exposed, the picture will come out in a few minutes, and will finally assume a reddish cast or hue, which will greatly interfere with the beauty of the positive impression,—the sky in a landscape will not present that opacity so essential to a successful proof, but will be patchy and uneven, showing some parts by transmitted light to be much lighter than others. The usual time of development of a picture is from one hour to one and a half; but this is of little consequence, as several of them can be placed in the gallic acid bath together, and developed at one time; some little care is necessary, however, in this part of the process, in order to prevent the staining that is so apt to occur. This may be obviated by occasionally turning the pictures in the bath, to remove any deposit that may have settled on their surfaces.

FIXING THE PROOF

Is effected by immersion of the paper in a solution of hypo-sulphite of soda, of the strength of—

Hypo-sulphite of soda	4 ounces.
Water	1 pint.

And allowing it to soak until all the yellow colour is dispelled from the light parts; this will generally be the case in about ten minutes or a quarter of an hour, after which it is to be removed to a pan and well washed in abundance of cold water for about two hours, and finally it is to be hung up to dry. When perfectly dry, place the picture between folds of blotting paper, and pass a hot iron over it, in order to re-melt the wax, and restore the transparency which has been partially lost during the various manipulations. This will complete the process of obtaining a negative picture on waxed paper.

THE POSITIVE PAPER PROCESS.

APPARATUS REQUIRED FOR THE POSITIVE PAPER PROCESS.

Soft-wood board.
Glass rods.
Ditto measure.
Pins.
Reversing frame.

SOLUTIONS REQUIRED IN THE POSITIVE PAPER PROCESS.

Pure chloride of sodium	5 grains.
Distilled water	1 ounce.

Nitrate of silver	60 grains.
Distilled water	1 ounce.

Hypo-sulphite of soda . . .	2 ounces.
Water	1 pint.
Chloride of silver	20 grains.
Chloride of gold	10 grains.

Dissolve and filter.

The pictures obtained by any of the foregoing processes, are what are technically termed "negatives," that is to say, the natural light and shade of the subject is reversed,—the sky in a landscape presenting a black appearance, while the more shady parts are more or less transparent, according to the degree of shadow in which they were at the time of exposure.

In the case of a portrait by the Collodion process, the face, hands, &c., are black, while the coat and the dark clothes remain transparent, in proportion to the amount of light that is reflected from their surfaces.

It is the design of the present process to reverse this order of things, and to produce pictures on paper from either glass or paper negatives, having the lights and shadows in their correct positions. The operation consists essentially in forming a chloride of silver on the surface of the paper, exposing this to the action of light, and then fixing the picture thus obtained.

PREPARATION OF THE PAPER.

The paper best adapted for the purpose, is either Canson's or Towgood's positive, and having selected a sheet free from specks and blemishes, prepare the following solution:—

Pure chloride of sodium . . .	5 grains.
Water, distilled	1 ounce.

Pin the paper, with the smoothest side upwards, to the soft-wood board, and, by means of the glass rod, spread over its surface the above solution; allow it to stand for two minutes, and hang up to dry. Any number of sheets may be thus prepared, and kept in a portfolio free from damp, for an indefinite period. In order to make the paper sensitive, it must be again pinned to the board,—the salted side upwards, and the surface treated with the following solution:—

Nitrate of silver	50 grains.
Distilled water	1 ounce.

Suffer it to remain undisturbed for two minutes, and then hang up by two of its corners to dry. When dry, the paper is fit to be placed in the reversing frame to be exposed to the solar agency.

THE REVERSING FRAME.

If we expose a piece of the paper as prepared above to the agency light, it will in a very short time become blackened; but if any opaque object be placed upon it, the part immediately beneath that object will remain perfectly white. It is on this principle that the production of positive pictures depends. Thus we place a piece of the prepared paper with its sensitive side upwards on any convenient support, and bring the face of the negative in contact with it. If now we allow the light to shine through the negative, we shall find on inspecting the positive paper underneath that a very decided action has taken place over those parts corresponding with the light portions of the superposed negatives.

The mode of accomplishing this end in practice is by means of a frame of wood, in which is fixed a stout plate of glass: on this we place the negative, either glass or paper, face upwards—that is, turned away from the surface of the glass. The sensitive side of the positive paper is now brought in contact with the negative, and a board, lined with cloth or velvet, is placed over the whole; this in its turn is pressed down hard so as to bring the two in close contact by means of suitable screws and fastenings.

The back board in the reversing frame is hinged, which allows the operator to examine the state of forwardness of the picture by releasing one side at a time, and carefully separating the positive paper from the negative. The picture, after exposure for the proper time to the light, ought to be somewhat darker than the desired colour, to counteract the effect of the fixing bath which takes part of the intensity from it.

THE FIXING BATH

Is composed of—

Hypo-sulphite of soda	2 ounces.
Water	1 pint.
Chloride of silver	20 grains.
Chloride of gold	10 do.

Dissolve and filter before use.

The positive picture which has been over printed, as directed above, is plunged into this bath, and is allowed to remain immersed until the desired tint is obtained. It ought not to be removed before the expiration of ten minutes, otherwise all the chloride of silver will not be dissolved and removed from the paper. It is essential that such should be the case, as it is this salt which plays the part of the sensitive agent in the positive paper. Any tint may be obtained in this bath, from a rich sepia to a fine neutral tint, the time of immersion determining the exact shade of colour.

On being removed from the hypo-sulphite bath, the picture is to be thoroughly washed in four or five waters for five minutes in each; and lastly, it is to be soaked for two hours in a capacious pan of clean water.

Suspension in a warm place to dry, and subsequent ironing, will complete the process of taking positive pictures on plain paper. There is, however, another method, or rather a modification of the last, by which the paper is coated with a layer of albumen, in which has been dissolved the chloride of sodium. In this mode we obtain pictures of exquisite minuteness of detail, the surface on which the image is formed being free from those irregularities appertaining to ordinary paper.

ALBUMENIZED POSITIVE PAPER PROCESS.

The subjoined method of preparing the Albumenized paper, will be found both certain and simple, and will give most excellent results:—

Throw the white of an egg into a deep dish, and add thereto five grains of chloride of sodium dissolved in two drachms of water; beat the whole into a perfectly white froth by means of a wooden fork or whisk, and having placed a double thickness of fine muslin in a glass funnel, transfer the froth to it; in the course of a few hours nearly the whole of it will have subsided into a clear liquid, which will fall into the bottle placed to receive it. The paper being selected, and a quantity of the salted albumen being poured into a perfectly clean flat-bottomed dish, to the depth of half an inch, we gently place the centre of the sheet on to the surface of the liquid, and gradually lower the sides (taking special care to exclude all air-bubbles) until the whole surface of the paper is in contact with the albumen, where it must remain for the space of three minutes, in order to absorb a good coating of the same. Now, carefully remove the sheet by two of its corners, and holding it over the dish to drain, pin it to a suitable support (as the edge of a shelf) to become dry. When quite dry, place the sheet between two pieces of perfectly smooth paper, and pass a moderately hot iron over the back of it, in order to coagulate the albumen, and to render it insoluble in the subsequent washings to which it will be subjected during the process. Paper prepared according to the directions just given, should present a fine glossy surface, free from any irregular patches, and should be of a pure white colour.

The Albumenized paper is rendered sensitive in precisely the same way as directed for the plain paper; the only precaution necessary to be observed is, that the glass rod must be very lightly applied, in order not to disturb the evenness of the surface. The time of allowing the silver solution to remain on, &c., is precisely the same as before described, as likewise the exposure in the reversing frame, and the fixing process; the only difference being, that the Albumenized paper will take a longer time to assume the darker tones in the fixing bath, than the paper prepared without the white of egg.

Pictures taken on this paper, for sharpness of outline and minuteness of detail, are immeasurably superior to those produced by the ordinary method.

If too much gloss be given to the paper by the adoption of the above formula, a little more water may be added to the white of egg; this will lessen the relative amount of albumen on the paper, and correspondingly diminish the gloss on the surface.

THE BLACK TINTS OF FRENCH PHOTOGRAPHS.

To those who prefer the very black tones which characterize the productions of M. Blanquart Evrard, of Lisle, the following formula and mode of operation, as recommended by Le Gray in a recent edition of his work, may be acceptable:—

Very much over-print the picture, in fact, until all the lights are of a pale violet colour, if the desired tint be a bluish-black;

a decided violet colour for a full black; and of a sepia colour if the peculiar greenish black be a desideratum.

When the proper tint is obtained, the proof is washed in clean water, and then placed in a bath, composed as follows:—

Distilled water	2 ounces.
Chloride of gold	1 grain.
Hydrochloric acid	25 minims.

The picture, which ought to be kept in a constant state of motion, will soon begin to change colour; when all the details appear clear it is to be removed to a bath containing a small quantity of liquor ammonia, and subsequently washed in several quantities of pure clean water. When all the acid is removed by this means, the proof is fixed by immersion in a bath, composed of hyposulphite of soda, 1 ounce; water, 6 ounces; where it is to remain for about three-quarters of an hour, until the desired colour is obtained; repeated washings for the space of two hours or more, and subsequent drying, will complete the process.

In concluding the description of the various Photographic processes on glass and paper, let me once more urge the necessity of attention to minute particulars in manipulation, and, above all, that cleanliness should characterize our operations in the highest degree: without this feature, no one can ever hope to attain proficiency in any department of this beautiful art, but, on the contrary, will meet with nothing but failures as a reward for his neglect on this head.

CATALOGUE

OF

APPARATUS & CHEMICAL PREPARATIONS

USED IN THE ART OF

PHOTOGRAPHY;

COMPRISING THE

Daguerreotype, Calotype, Waxed Paper, Albumen,

AND

Collodion Processes:

MANUFACTURED AND SOLD BY

BLAND & LONG,

OPTICIANS, PHILOSOPHICAL, PHOTOGRAPHICAL, AND
CHEMICAL INSTRUMENT MAKERS,

AND

OPERATIVE CHEMISTS,

153, FLEET STREET, LONDON.

1854.

PREFACE.

MESSRS. BLAND & LONG,

In submitting the following Catalogue of Instruments, Apparatus, and Chemical Preparations used in the beautiful Art of Photography, to the notice of Amateurs and Photographers in general, would take this opportunity of stating that nearly the whole of the Apparatus therein described, is manufactured on the premises under their own immediate superintendence; thereby ensuring instruments with all the most recent improvements, and at very moderate prices.

They would further state that, for the better carrying out of experiments in Photography, and the testing of Photographic Lenses during the manufacture, they have erected a spacious Glass Room, in which every requisite for the illustration of the various processes, and trial of Lenses, will be found.

Purchasers of Apparatus, and others desiring information, will receive every instruction and explanation as to the manipulations and scientific principles involved in the various photographic processes, either by letter or personally, at the establishment, No. 153, Fleet Street, London.

Orders from abroad, which should be accompanied by an order for payment in London, executed in the best manner, and in the shortest possible time.

Merchants and Agents supplied on liberal Terms.

Catalogue

OF

PHOTOGRAPHIC APPARATUS, &c.

LENSES.

Single Achromatic Lenses, unmounted, suitable for taking views by Calotype or Daguerreotype processes :—

	Diameter.	Focus.	£	s.	d.
No. 1.	1¼ inches	4 to 6 inches	0	6	0
2.	1½ "	6 to 7 "	0	8	0
3.	1¾ "	6 to 8 "	0	10	0
4.	2 "	8 to 10 "	0	14	0
5.	2¼ "	8 to 10 "	0	18	0
6.	2⅝ "	10 to 12 "	1	6	0
7.	3 "	12 to 14 "	1	16	0
8.	3½ "	12 to 14 "	2	10	0
9.	4 "	16 to 18 "	3	10	0

The same Lenses, mounted in handsome brass fronts, with rings for adaptation to Camera :—

	Diameter.	Simple sliding tube.			Rack & pinion.		
		£	s.	d.	£	s.	d.
No 1	1¼ inches	0	16	0	1	1	0
2.	1½ "	1	1	0	1	7	0
3	1¾ "	1	5	0	1	12	0
4.	2 "	1	12	6	2	2	0
5.	2¼ "	1	15	0	2	7	6
6.	2⅝ "	2	5	0	2	15	0
7	3 "	3	15	0	4	10	0
8.	3½ "	4	14	6	6	0	0
9	4 "	6	10	0	7	7	0

COMPOUND ACHROMATIC LENSES.

These combinations are particularly recommended from the qualities they possess of giving a flat field, and producing an image on the sensitive surface, in an extremely short space of time.

Combination Achromatic Lenses, mounted in handsome brass fronts, with rackwork adjustment, and adapted for either portraits or views:—

			£	s.	d.		£	s.	d.
No. 1	for pictures	4¼ by 3¼ inches .	2	10	0	and	3	13	6
No. 2.	"	5 by 4 " .	0	0	0		4	14	6
No. 3.	"	arranged for views and portraits					5	5	0
No. 4.	"	6½ by 4¾ inches .	5	10	0	and	7	7	0
No. 5.	"	arranged for views or portraits .	6	10	0		8	8	0
No. 6.	"	8½ by 6½ inches .	0	0	0		15	15	0
No. 7.	"	arranged for views and portraits					16	16	0

The arrangement of the above Lenses for views, consists in the removal of one lens in the combination, and placing the other in a different position in the sliding tube, with the requisite stops or diaphragms for regulating the amount of light.

BLAND & LONG'S LANDSCAPE LENSES.

Messrs. B. & L. feel great confidence in recommending these Lenses to amateurs and professional photographers, as they give a perfectly flat field, and from their quick action are particularly adapted for taking views where great delicacy is a desideratum.

		£	s.	d.
No. 1.	1¾ inches diameter, rackwork adjustment	2	12	6
No. 2.	2¼ " "	3	10	0
No. 3.	3 " "	5	10	0

MENISCUS LENSES.

	Diameter.		Focus.		£	s.	d.
No. 1	1¾ inches		8 to 10 inches		0	4	0
2	2	"	9 to 10	"	0	5	0
3	2¾	"	10 to 12	"	0	7	6
4	3	"	12 to 14	"	0	9	0
5	3½	"	14 to 16	"	0	10	6

MIRRORS.

Parallel Mirrors for placing in front of the lenses, to take pictures in their true position.

	£	s.	d.
For ¼ plate lens	1	10	0
½ "	2	12	6
Prisms adapted for same purpose, from	3	3	0

PHOTOGRAPHIC CAMERAS,

Adapted for views on paper and glass.

		£	s.	d.
No. 1.	Simple form of Camera, consisting of Mahogany box, with a Meniscus lens, mounted in brass front, for pictures 6 in. by 5 in., with Calotype back, and ground glass	1	7	6
No, 2.	Ditto, ditto, for pictures 8½ in. by 6½ in. . .	2	7	6
No. 3.	Mahogany Camera, with Achromatic lens, 1¾ in diameter, mounted in brass front, with two backs, one for paper and the other for Collodion pictures; size of paper 6 in. by 5 in., ditto glass plates 4 in. by 3 in., and 3¼ in, by 2¾ in. . .	3	3	0
No. 4.	Ditto, ditto, with double back, suitable for paper only, size 7 in. by 6 in.	3	3	0
No. 5.	Ditto, ditto, with Achromatic lens, 2¼ in. diameter, mounted in brass front, of superior construction, with two backs for paper 7 in. by 6 in., and Collodion pictures 5 in. by 4 in., 4 in. by 3 in., and 3¼ in. by 2¾ in.	4	4	0
No. 6.	Ditto, with Achromatic lens 2⅝ in diameter, in brass front, double back for paper 9 in. by 7 in.	5	10	0

RIGID CAMERAS,

For the Paper processes only.

		£	s.	d.
No. 1.	Mahogany Camera, with single Achromatic lens, mounted in sliding brass front, with one double back for views, 6 in. by 5 in.	2	12	6
No. 2.	Ditto, ditto, of superior construction . .	4	0	0
No. 3.	Ditto, ditto, with double combination Achromatic lens, for views 6 in. by 5 in., or portraits 4½ in. by 3½ in.	6	10	0
No. 4.	Ditto, ditto, with single Achromatic lens, 2½ in. diameter, mounted in sliding brass front, with double back for views 7 in. by 6 in. . . .	4	10	0
No. 5.	Ditto, ditto, of superior construction . .	5	10	0
No. 6.	Ditto, ditto, with double combination Achromatic lens, sliding front for adjusting proportion of foreground and sky, for views 7 in. by 6 in., or portraits up to 5 in. by 4 in.	9	9	0
No. 7.	Ditto, ditto, with single Achromatic lens, mounted in sliding front, double back for views 9 in. by 7 in.	6	0	0
No. 8.	Ditto, ditto, of superior construction, with sliding plate for adjustment of foreground and sky	7	7	0
No. 9.	Ditto, ditto, with compound Achromatic lens, sliding adjustment, adapted for views 9 in. by 7 in., or for portraits up to 6 in. by 5 in. . .	12	0	0
No. 10.	Ditto, ditto, of best construction, with compound Achromatic lens, and sliding front for adjusting foreground and sky, for views 10 in. by 8 in., or portraits up to 8½ in. by 6½ in.	19	0	0

SLIDING BODY CAMERAS,

Adapted for Calotype, Daguerreotype, and Collodion processes.

		£	s.	d.
No. 1.	Walnut Camera, sliding body, with single Achromatic lens, and slides adapted for paper, plates, and glass, size 4¼ in. by 3¼ in.	1	15	0
No. 2.	Ditto, ditto, with single Achromatic lens, adapted for paper, plates, and glass 6½ in. by 4¾ in. . . .	2	17	6
No. 3,	Ditto, ditto, single Achromatic lens, adapted for plates, paper, and glass 8½ in. by 6½ in. . . .	4	10	0
No. 4.	Mahogany sliding body Camera, best construction, with ground glass frame and two backs, for paper, glass, or Daguerreotype processes, with Achromatic combination lens, suitable for portraits 4¼ in. by 3¼ in., and views 6 in. by 5 in. . . .	6	16	6
No. 5.	Ditto, ditto, with Achromatic combination lens, for portraits of sizes to 6½ in. by 4¾ in., and views 7 in. by 6 in., adapted for paper, Daguerreotype, and glass processes	11	10	0
No. 6.	Ditto, ditto, with compound Achromatic lens, with fine rackwork adjustment, ground glass frame and two backs, for portraits on paper, plates, and glass up to 6 in. by 5 in., and single Achromatic lens with sliding tube adjustment, for paper views 9 in. by 7 in.	15	0	0
No. 7.	Ditto, ditto, with compound Achromatic lens as before, with ground glass frame and two backs, suited for Calotype, Daguerreotype, and Collodion portraits up to 8½ in. by 6½ in., and views, &c. 10 in. by 8 in.	21	0	0

FOLDING PHOTOGRAPHIC CAMERAS.

This form of Camera will be found of great convenienc where portability is a desideratum, and consequently most efficient for the purposes of the traveller and tourist.

These Instruments are of the best workmanship, and are so constructed as not to warp nor lose their shape when exposed to the sun and weather:

		£	s.	d.
No. 1.	Mahogany folding Camera, with single Achromatic Lens, mounted in brass front, with double back, for views, 6 in. by 5 in.	4	4	0
No. 2.	Ditto, ditto, of superior construction	5	10	0
No. 3.	Ditto, ditto, with double-combination lens, and adjustment for regulating amount of foreground and sky, suitable for views 6 in by 5 in. or portraits 4¼ in. by 3¼ in.	8	18	6
No. 4.	Ditto, ditto, with single Achromatic lens, 2¼ in. diameter, mounted in brass front, with double back for paper views, 7 in. by 6 in.	5	5	0
No. 5.	Ditto, ditto, of superior construction	7	7	0
No. 6.	Ditto. ditto, with double-combination Achromatic lens, and sliding front for adjusting foreground and sky, for views 7 in. by 6, or portraits up to 5 in. by 4 in.	11	5	0
No 7	Ditto, ditto, with single Achromatic lens, mounted in brass front, double back for paper, 9 in. by 7 in.	7	7	0
No. 8.	Ditto, ditto, best make and quality.	9	9	0
No. 9.	Ditto, ditto, of best construction, with double-combination Achromatic lens, mounted in brass front, with rackwork adjustment, sliding front, adapted to portraits up to 6 in. by 5 in., or views 9 in. by 7 in.	14	14	0
No 10	Ditto, ditto, of best construction, with double-combination Achromatic lens, mounted in brass front, with rackwork adjustment, sliding front, suitable for views 10 in. by 8 in., and portraits 8½ in. by 6½ in.	21	0	0

Leather sling Cases for holding the above Cameras, very convenient for travelling, from £1 to £3.

Traversing Cameras, by which a panoramic view may be taken with a small lens, from £10 10s

TRIPOD STANDS FOR CAMERAS.

To ensure success in taking either portraits or views, it is very essential that the Camera should be perfectly free from vibration; if this be not the case, it is obviously impossible to obtain a perfectly sharp impression. Lightness, with freedom from vibration, are combined in the Camera Stands offered in the following list:—

	£	s.	d.
No. 1. Tripod, with metal top, double legs of mahogany, suitable for small Camera	0	12	0
No. 2. Ditto, ditto, larger size, and of superior construction	0	18	0
No. 3. Tripod, with double legs of ash, metal top, extremely firm and free from vibration, forming when apart a very portable stand	1	10	0
No. 4. Ditto, ditto, with legs jointed for convenience of carriage	1	17	6
No. 5. Tripod, with double legs, and large ball and socket joint for adjustment of Camera	1	10	0
No. 6. Tripod, with sliding adjustment for raising or depressing Camera, convenient for an operating room	1	18	0
No. 7. Tripod, with double legs of ash, mahogany top	1	5	0
No. 8. Tripod, with double legs, and board and screw at top, for inclining camera	1	10	0
No. 9. Tripod, with double legs of ash, with screw joints, very portable	2	2	0

HEAD RESTS,

For enabling the Sitter to keep the Head in one position without fatigue.

		£	s.	d.
No. 1.	Head Rest of simplest form, for attaching to back of chair . . . . . . 5s. &	0	7	6
No. 2.	American pattern ditto	1	1	0
No. 3.	Universal ditto, with means of adjustment for every position of the head	1	10	0
No. 4.	Ditto, ditto, with heavy iron foot and brass sliding tube, which enables this rest to be used either for standing or sitting posture . . .	3	3	0

APPARATUS USED IN THE DAGUERREOTYPE.

Under this head are enumerated all the apparatus, materials, and preparations required by the Photographer in operating on Silvered Plates.

DAGUERREOTYPE PLATES, ENGLISH MANUFACTURE.

Size.	Best.	2nd quality.	Size.	Best.	2nd quality
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
2½ by 2	0 12 0	0 12 0	5 by 4	2 5 0	2 3 0
3¼ by 2¾	1 0 0	0 18 0	6 by 4½	3 5 0	3 0 0
4 by 3	1 8 0	1 7 0	8½ by 6½	5 12 0	5 0 0
4¼ by 3¼	1 12 0	1 10 0	—	—	—

PLATES, BEST FRENCH MANUFACTURE.

Size.	40ths.	30ths.	Electro-Plated.
	£ s. d.	£ s. d.	£ s. d.
2½ by 2	0 4 0	0 5 0	0 5 6
3¼ by 2¾	0 6 0	0 7 6	0 8 6
4 by 3	0 9 0	0 10 6	0 12 0
4¼ by 3¼	0 10 0	0 11 6	0 13 0
5 by 4	0 14 6	0 15 6	0 19 0
6½ by 4¾	1 1 0	1 3 6	1 5 0
8½ by 6½	1 18 0	2 2 0	2 7 6

APPARATUS USED IN DAGUERREOTYPE.

PLATE BOXES.

Each containing grooves for 12 plates.

Size.	Mahogany.			Walnut Wood.		
	£	s.	d.	£	s.	d.
2½ by 2 inches.	0	3	0	0	1	8
3¼ by 2¾ "	0	4	0	0	2	0
4 by 3 "	0	4	6	0	2	3
4¼ by 3¼ "	0	5	0	0	2	6
5 by 4 "	0	5	6	0	3	0
6½ by 4¾ "	0	6	0	0	3	6
8½ by 6½ "	0	7	6	0	4	6

PLATE HOLDERS.

Plate holders of wood, with brass corners and cramp to fix to table while cleaning or polishing.

	£	s.	d.
No. 1. For plates, 2½ by 2 inches . .	0	2	0
No. 2. " 3¼ by 2¾ " . .	0	2	6
No. 3. " 4 by 3 " . .	0	2	9
No. 4. " 4¼ by 3¼ " . .	0	3	0
No. 5. " 5 by 4 " .	0	3	3
No. 6. " 6½ by 4¾ " . .	0	3	6
No. 7. " 8½ by 6½ " . .	0	4	0

Simple polishing block, for holding the plate while buffing, 1s. 6d. and 2s. 6d.

Metal plate holders, for use with circular buffs in the lathe, or for securing the plate while buffing by hand, of superior make.

	£	s.	d.
For plates, 2½ by 2 inches . . .	0	6	0
" 3¼ by 2¾ " . . .	0	7	6
" 4 by 3 " . . .	0	8	6
" 5 by 4 " . . .	0	10	0
Handle of hard wood, with steel pin for use with ditto	0	1	0

AMERICAN PLATE HOLDER,

Consisting of a strong iron clamp, which firmly secures one edge of the plate, and allows of vigorous use of the buff.

	£	s.	d.
Iron clamp on wood block	0	7	6
Flat iron blocks for plates:—			
No. 1. 2½ by 2 inches	0	2	0
No. 2. 3¼ by 2¾ "	0	2	6
No. 3. 4 by 3 " or 4¼ by 3¼ inches .	0	3	0
No. 4. 6½ by 4¾ "	0	5	0
Apparatus for bending the edges of thin French plates, to prevent injury to the buff . . .	0	8	0
Pliers of an improved form, for bending the corners of plates, and also for holding the plate in drying	0	2	0

BUFFS.

The materials used in covering these buffs are rendered free from grease and any other impurities naturally existing in them.

	Size.	Velvet.			Doeskin.		
		£	s.	d.	£	s.	d.
No. 1.	12 by 3 inches.	0	3	0	0	5	0
No. 2.	15 by 3 "	0	4	0	0	6	0
No. 3.	16 by 4 "	0	4	6	0	7	6
No. 4.	9 by 6 "	0	5	0	0	8	0

		£	s.	d.
Best carded cotton wool	per lb.	0	3	0
Hard wood sifting boxes, for containing polishing powders	each	0	1	6

Materials for polishing plates *(see page 74)*.

IODINE AND BROMINE PANS.

		£	s.	d.
Porcelain dishes for Iodine or Bromine, with ground glass covers, from		0	2	0
Glass dishes with air-tight covers:—				
4½ by 3½ by 2 inches	each	0	8	6
7 by 5 by 3 "	"	0	13	0
8¾ by 6¾ by 3 "	"	0	19	0

IODINE AND BROMINE BOXES.

Single Iodine or Bromine box, of French polished mahogany, with glass pan, ground glass air-tight cover, and mirror for viewing the plate while under the influence of the vapour:—

	£	s.	d.
For plates 4¼ by 3¼ inches downwards	1	5	0
" 6½ by 4¾ " "	2	2	0
" 8½ by 6½ " "	3	10	0

COMPOUND IODINE AND BROMINE BOXES.

This form of Bromine box is extremely convenient, as it enables the operator to readily change the plate from the Iodine to the Bromine without exposure, and at the same time to see the colour produced by the vapour

Compound Iodine and Bromine box, of French polished mahogany, with glass pans, polished sides, mirrors, and set of frames, &c., complete:—

	£	s.	d.
For plates 4¼ by 3¼ inches, and under	2	7	6
" 6½ by 4¾ " "	3	13	6
" 8½ by 6½ " "	6	6	0

Single Iodine or Bromine boxes, French pattern, without mirrors:—

	Delf pans.			China pans.		
	£	s.	d.			
For ¼ plate size, with set of frames	0	13	0	0	16	0
½ plate " "	0	16	0	1	0	0
whole plate size "	1	0	0	1	12	0

Double Iodine and Bromine boxes, French pattern, without mirrors:—

For ¼ plate size, with set of frames	1	6	0	1	16	0
½ plate " "	1	12	0	2	6	0
whole plate size "	2	2	0	2	18	0

MERCURY BOXES.

	£	s.	d.
Mercury box, of mahogany, with shifting legs, cast-iron cistern, and frames, complete:—			
No. 1. for plates 4¼ by 3¼ inches	0	15	0
No. 2. " 6½ by 4¾ "	1	5	0
No. 3. " 8½ by 6½ "	1	15	0
Ditto, ditto, French pattern, walnut wood:—			
No. 1. for plates 4¼ by 3¼ inches	0	12	0
No. 2. " 6½ by 4¾ "	0	16	0
No. 3. " 8½ by 6½ "	1	2	6
Thermometers with ivory scales to mercury boxes, each	0	7	6
Mercury boxes of improved construction, with window and yellow glass, for viewing the picture during the action of the mercury:—			
No. 1. for plates 4¼ by 3¼ inches	1	4	0
No. 2. " 6½ by 4¾ "	1	10	0
No. 3. " 8½ by 6½ "	2	2	0

MISCELLANEOUS APPARATUS.

	£	s.	d.
Fixing Stands with levelling screws:—			
No. 1. for ¼ plate size	0	3	6
No. 2. ½ "	0	5	6
No. 3. whole plate size	0	7	6
Glass Spirit Lamps, each 1s., 1s. 6d., 2s., 2s. 6d., to	0	5	0
Gas Jets, with metal chimney and gauze, with flexible tube for burning off plates without smoke, each	0	10	6
Lanterns, furnished with yellow glass shades, for use in dark room 5s. and	0	8	0
Brass Spirit Lamps from	0	2	6
Porcelain Washing Pans:—			
No. 1. size 5½ by 4½ by 1⅛	0	1	0
No. 2. " 7¼ by 6 by 1⅛	0	1	6
No. 3. " 10 by 8 by 1⅝	0	3	0

GLASS GRADUATED MEASURES.

	£	s.	d.		£	s.	d.
1 oz. . .	0	1	3	6 oz. . .	0	2	4
2 oz. . .	0	1	4	8 oz. . .	0	2	9
4 oz. . .	0	2	0	Minim ditto .	0	1	0

		£	s.	d.
Glass Funnels . .	each, 4d., 6d., and	0	1	0
Ditto Syringes	from each	0	0	4
Ditto, ditto, graduated . . .	“	0	1	0

STILLS.

It is found very convenient frequently, to have at hand the means of obtaining pure water at a trifling cost; this desideratum is acquired in a very economical way by the use of a small still, which can be placed over a common fire.

	£	s.	d.
Tin Still to hold half a gallon, with worm tub complete, for use over the common fire	0	17	6
Ditto, ditto, one gallon	1	1	0
Ditto, ditto, two ditto	1	7	6
Copper ditto, half ditto	1	10	0
Ditto, ditto, one ditto	2	2	0

ELECTRO-SILVERING APPARATUS,

For giving a coating of pure silver to Daguerreotype plates, and also for re-silvering used up plates.

Smee's Batteries No. 1, 8s 6d. No. 2, 11s. 6d.

		s.	d.
Glass Cells, fitted with binding screws complete:—			
For plates 4¼ by 3¼ inches . . .		5	6
Ditto 6½ by 4¾ “		7	6
Ditto 8½ by 6½ “		15	0
Porcelain Cells, fitted as above:—			
For plates 4¼ by 3¼ inches . . .		4	0
Ditto 6½ by 4¾ “		6	0
Pure silver foil for the above .	per oz.	8	6
Argento-Cyanide of Potassium	per pint	10	0
Ditto, ditto, full strength ,	“ oz.	1	0

APPARATUS, &c., USED IN THE CALOTYPE AND OTHER PAPER PROCESSES.

Porcelain pans with flat bottoms, for preparing & washing paper:—

	s.	d.
No. 1. size 5½ by 4½ by 1⅛ inches . .	1	0
No. 2. " 7¼ by 6 by 1⅛ " . .	1	6
No. 3. " 10 by 8 by 1⅝ " . .	3	0
No. 4. " 8¾ by 6¾ by 1⅛ " . .	1	3
No. 5 " 10 by 7½ by 1⅛ " . .	1	6
No. 6. " 11 by 9 by 1⅛ " . .	2	0
No. 7 " 13 by 11 by 1¼ " . .	4	0
No. 8. " 15 by 11 by 1½ " . .	5	0
No. 9. " 9½ by 8½ by 2¾ " . .	2	6
No. 10. " 10½ by 8½ by 2¼ " . .	2	9
No. 11. " 11 by 10 by 2¾ " . .	3	0

GUTTA PERCHA WASHING TRAYS.

No. 1. Nest of three gutta percha trays:—		
Size of largest 10 by 8 by 1¾ inches . .	9	0
No. 2. Nest of three ditto:—		
Largest 11 by 9 by 1¾ inches . . .	12	0
Gutta percha pans, of very superior finish, with perfectly flat and polished bottoms:—		
No. 1. size 12½ by 10½ inches . . .	8	0
No. 2. " 12 by 10 " . . .	6	6
No. 3. " 11½ by 9½ " . . .	5	6
No. 4. " 11 by 9 " . . .	4	0
Or nest of four of above sizes . . .	21	0
Boards for the preparation of paper:—		
No. 1. for paper 6 by 5 inches . . .	1	6
No. 2. " 7 by 6 " . . .	1	9
No. 3. " 9 by 7 " . . .	2	0
Glass rods for spreading the solutions . .	each, 4d. and 6d.	
Ditto, Graduated Measures:—		

	s.	d.		s.	d.
1 oz. . .	1	3	8 oz.	2	9
2 oz. . .	1	4	Minim Measures,		
4 oz. . .	2	0	120 drops .	1	0
6 oz. . .	2	4	Do., do., ½ oz .	1	0

GLASS FUNNELS,

Ribbed inside, for filtering.

			s.	d.
No. 1.	2	inches diameter	0	4
No. 2.	2½	"	0	5
No. 3.	4	"	0	6
No. 4.	5	"	0	8
No. 5.	6	"	1	0
No. 6.	7	"	1	4

Funnels, Wedgwood, cream colour, ribbed inside:—

			s.	d.
No. 1.	2	inches diameter	0	5
No. 2.	3½	"	0	8
No. 3.	4	"	0	10
No. 4.	5	"	1	4
No. 5.	6	"	2	0
No. 6.	6½	"	2	6

FILTER HOLDERS, very useful for filtering small quantities of liquid . . . each, 3d., 6d., and 8d.

GLASS SYRINGES, for taking up definite quantities of solutions. Plain, from 4d.; Graduated, from 1s.

Stands for holding Funnels, with 3 sliding rings, each, 3s. and 4s.

SCALES AND WEIGHTS.

		£	s.	d.
No. 1.	In oak box, metal pans	0	3	6
No. 2.	Ditto "	0	5	0
No. 3.	Ditto glass pans	0	7	0
No. 4.	Mahogany box "	0	12	0
No. 5.	Ditto, with brass pillar and glass shifting pan, with drawer	2	2	0

CAMEL'S HAIR BRUSHES,

Made expressly for Calotype.

			s.	d.				s.	d.
1½	inches broad,	each	1	6	3	inches broad,	each	2	6
2	"	"	1	9	4	"	"	3	6
2½	"	"	2	3	5	"	"	4	6

Thick round ditto . . . each, 1s., 1s. 6d., and 2 0

BLAND & LONG'S ALBUMENIZED PAPER.

For Printing from Glass or Paper Negatives

The great superiority of the definition obtained by this method of printing over that of the ordinary process, renders it necessary that all pictures—where great minuteness of detail is essential to their successful effect—should be printed on Albumenized paper. It is easily prepared, and will give every colour, from a Sepia to a perfect black.

		£	s.	d.
Size, 17½ by 11 inches	per quire	0	10	0
Do., 11 by 9 "	"	0	5	0

Drawing Pins, for hanging up wet paper, 5d. per dozen.

PHOTOGRAPHIC PAPER.

As much of the success of the Talbotype and other paper processes depends on the nature of the material on which the sensitive compound is placed, a careful selection of papers from the best makers has been made, combining fineness of surface and evenness of texture, with a proper tenacity to allow of the necessary washings to which the paper is exposed in the various manipulations.

			Per quire		
			£	s.	d.
Canson Frères—					
	Size, 22½ in. by 17½ in.	Negative . . .	0	3	6
		Positive . . .	0	4	6
Whatman's—					
	Size, 19 in. by 15 in.	Negative . . .	0	3	0
		Positive . . .	0	2	6
Turner's Photographic paper—					
	Size, 15 in. by 9 in.	Negative . . .	0	3	0
		Positive . . .	0	1	6
Sandford's best, negative and positive;	size, 15 by 9 in.		0	2	6
Ditto, waxed paper	" 17 by 11 in.		0	19	0
Ditto " iodized	" "		1	4	0
Ditto, iodized paper . . .	" 19 by 15 in.		1	4	0
Bland and Long's iodized paper,	9½ by 7½ in., per doz.		0	4	0

		£	s.	d.
Solution for iodizing paper	per oz.	0	1	6
Ditto ditto for waxed paper	per pint	0	5	0
Ditto, for rendering the above sensitive .	"	0	9	0
White bibulous paper, prepared free from iron or other impurities	per quire	0	1	6
Papier Joseph	"	0	1	0

REVERSING FRAMES,

For obtaining Positive pictures.

These Frames are so constructed that a uniform pressure may be obtained, thus ensuring perfect contact between the negative and positive papers.

	Size of glass.	£	s.	d.
No. 1. . . .	6½ by 5 inches .	0	5	0
No. 2. . . .	8 by 6 " . .	0	7	6
No. 3. . . .	10½ by 8½ " . .	0	12	0
No. 4. with screws at side,	14 by 9 " . .	1	5	0
No. 5. " .	17 by 11 " . .	1	10	0

FRENCH PATTERN REVERSING FRAMES, with hinged back, by which the progress of the picture may be observed :—

		£	s.	d.
No. 1. . . .	7 by 6 inches .	0	10	0
No. 2. . . .	10 by 8 " . .	0	14	0
No. 3. . . .	12 by 9 " . .	1	1	0

APPARATUS USED FOR THE COLLODION AND ALBUMEN PROCESSES.

In the following list will be found all the necessary materials and apparatus for use in both the Collodion and Albumenized Glass processes, together with forms of Focimeter for determining the chemical foci of lenses.

GLASS PLATES, WITH GROUND EDGES.

Size.	Per dcz.		Size.	Per doz.	
	s.	d.		s.	d.
3¼ by 2¾ inches .	1	4	5 by 4 inches .	2	3
4 by 3 " .	1	6	6 by 5 " .	3	6
4¼ by 3¼ " .	1	9	8½ by 6½ " .	6	6

BOXES FOR HOLDING GLASS PLATES.

	s.	d.		s.	d.
No. 1. 3¼ by 2¾ inches, for containing 12 plates	2	0	and	2	9
No. 2. 4 by 3 " " .	2	3	"	3	0
No. 3. 4¼ by 3¼ " " .	2	6	"	3	6
No. 4. 5 by 4 " " .	3	0	"	4	0
No. 5. 6 by 5 " " .	3	6	"	4	8
No. 6. 8½ by 6½ " " .	4	6	"	6	6

GUTTA PERCHA BATHS,

With Mahogany Stands, for Nitrate of Silver.

No. 1. For plates 4 by 3 inches . . .	each	3	0
No. 2. " 5 by 4 " . . .	"	4	0
No. 3. " 6 by 5 " . . .	"	5	0
No. 4. " 7 by 6 " . . .	"	6	6
No. 5. " 8½ by 6½ " . . .	"	8	6
Glass Baths for ditto	from	5	6

Glass Dippers, for plunging the plates into the bath of Nitrate of Silver:—

No. 1, 8d. No. 2, 10d. No. 3, 1s.

Porcelain Pans for washing, &c. *(See page 67).*

LEVELLING STANDS,

With screws, for laying glass plates with Albumen, or developing Collodion pictures.

	s.	d.
No. 1. For small plates	3	6
No. 2.	5	6
No. 3.	7	6

SCALES AND WEIGHTS.

No. 1. In oak box, metal pans . . .	3	6
No. 2. ditto ditto . . .	5	0
No. 3. ditto glass pans . . .	7	0
No. 4. In mahogany box, ditto . . .	12	0
No. 5. Ditto, with brass pillar, and glass shifting pan with drawer . .	42	0

BLAND AND LONG'S VARNISH,

For protecting the Collodion picture from injury during printing . . . . per ounce, 4d

This varnish is a most perfect protection and is easily applied; it possesses the qualities of extreme hardness, transparency, and rapidity of drying in the highest degree.

FILTER RINGS, useful in filtering small quantities of liquids . . . . each, 3d., 6d., and 8d.

GLASS GRADUATED MEASURES *(See page 65)*.

	£	s.	d.
CLAUDET'S FOCIMETER, for ascertaining the amount of separation existing between the optical and chemical foci of lenses . .	2	2	0
Bland and Long's form of Focimeter	1	10	0

DAGUERREOTYPE COLOURS.

No. 1.	Box, containing 10 best colors, gold and silver shells, and an assortment of brushes . . .	0	14	0
No. 2.	Ditto, ditto, 12 best colors, gold and silver shells, brushes, &c.	1	10	0
No. 3.	Box, containing 15 colors of finest quality, in small bottles with directions, an assortment of brushes, gold and silver shells, and elastic bottle	2	2	0
No. 4.	Redman's improved colors, in box . .	1	1	0
No. 5	Mansion's ditto, ditto. . £1 11s. 6d. &	2	10	0
Separate colors . .	per bottle, 2s., 2s. 6d. &	0	3	0
Camel's hair brushes . . .	per dozen, 1s. &	0	2	0
Sable ditto, ditto	4s. &	0	5	0

Elastic bottle, for removing dust from the plate:—

No. 1, 3s. No. 2, 4s. No. 3, 5s.

MOROCCO CASES,

With Gilt Mats.

Morocco cases, fitted with gilt mats and glasses, for finished pictures.

					Best.			2d quality		
					£	s.	d.	£	s.	d.
No 1.	For plates,	2½ by 2	inches,	per doz.	0	12	0	0	10	0
No. 2.	“	3¼ by 2¾	“	“	1	0	0	0	17	0
No. 3.	“	4 by 3	“	“	1	8	0	1	4	0
No. 4.	“	4¼ by 3¼	“	“	1	10	0	1	6	0
No. 5.	“	5 by 4	“	“	2	2	0	2	0	0
No. 6.	“	6½ by 4¾	“	“	4	4	0			

MOROCCO FRAMES,

With Suspension Rings, Mats, and Glasses.

					£	s.	d.
No. 1.	For plates,	2½ by 2	inches . .	per dozen	0	8	0
No. 2.	“	3¼ by 2¾	“ . . .	“	0	14	0
No. 3.	“	4 by 3	“ . . .	“	0	16	0
No. 4.	“	4¼ by 3¼	“ . . .	“	0	18	0

GILT MATS,

Of superior quality, of Oval, Dome, or Cushion Shapes.

					£	s.	d.
No. 1.	For plates,	2½ by 2	inches . .	per dozen	0	2	0
No. 2.	“	3¼ by 2¾	“ . . .	“	0	2	9
No. 3.	“	4 by 3	“ . . .	“	0	4	6
No. 4.	“	4¼ by 3¼	“ . . .	“	0	5	6
No. 5.	“	5 by 4	“ . . .	“	0	7	0

BLACK PAPIER MACHE FRAMES,

With Gilt Rim and Suspension Ring.

				£	s.	d.
No. 1.	2½ by 2	inches	each	0	4	0
No. 2.	3¼ by 2¾	“	“	0	5	6
No. 3.	4 by 3	“	“	0	6	6
No. 4.	4¼ by 3¼	“	“	0	7	6

ORMOLU FRAMES,

With Gilt Mats and Glasses.

		£	s.	d.
No. 1.	For plates, 2½ by 2 inches	0	1	9
No. 2.	“ 3¼ by 2¾ “	0	2	9
No. 3.	“ 4¼ by 3¼ “	0	4	0
No. 4.	“ 5 by 4 “	0	7	6
No. 5	“ 6½ by 4¾ “	0	10	6

PASSE PARTOUTS,

For Daguerreotype, Glass, or Paper Portraits and Views.

		Dark ground			White & gold		
		£	s.	d.	£	s.	d.
No. 1.	For plates, 2½ by 2 inches, per doz.	0	5	0	0	6	0
No. 2.	“ 3¼ by 2¾ “ “	0	6	0	0	7	0
No. 3.	“ 4 by 3 “ “	0	7	0	0	8	0
No. 4.	“ 4¼ by 3¼ “ “	0	7	6	0	8	6
No. 5.	“ 5 by 4 “ “	0	10	6	0	12	0
No. 6.	“ 6½ by 4¾ “ “	0	14	0	0	16	0
No. 7	“ 8½ by 6½ “ “	1	7	0	1	10	0

GUTTA PERCHA FRAMES.

	£	s.	d.
For No 1 Passe Partouts	0	1	0
“ No. 2 “	0	1	6
“ No. 3 “	0	2	0

Larger sizes to order.

PURE CHEMICALS AND PREPARATIONS

Used in the Photographic Processes.

Messrs. Bland and Long feel great confidence in submitting the following list of Chemicals, &c., to the notice of Photographers, as being of the first quality and of perfect purity.

DAGUERREOTYPE.

		£	s.	d.
Bromine, in 1 oz. bottles		0	3	6
" Solution	per oz.	0	0	4
" Chloride, prepared for use	"	0	0	6
Bromide of lime	per bottle	0	2	9
" iodine	per oz.	0	1	0
Chloro-bromide of lime	per bottle	0	3	6
Charcoal, prepared, for polishing plates	per packet	0	1	0
Cotton wool, best	per oz. 3d., per lb.	0	3	0
Gold, Chloride, in bottles	¼ dram	0	3	6
" "	½ "	0	6	0
" "	1 "	0	11	0
" "	2 "	1	1	0
Gold, Salt of (Sel d'or)	per bottle	0	4	6
Iodine, pure, re-sublimed (variable)	per oz.	0	2	0
" Commercial	"	0	1	6
" Tincture	"	0	0	6
" Chloride	"	0	3	0
Lime, Bromide	per bottle	0	2	9
" Iodide	"	0	2	6
Lamp Black, prepared, for buffing	per packet	0	1	0
Mercury, pure distilled	per oz. 4d., per lb.	0	4	0
Naphtha, for lamp	per pint	0	1	6
Rottenstone, prepared, for polishing	per ounce	0	0	6
Rouge " "	"	0	0	6
Sensitive solution	per bottle	0	2	6
Silver solution (Argento-cyanide of potassium), for re-silvering Daguerreotype plates	per ounce	0	1	0
Soda, Hyposulphite, pure	per lb. 1s. 6d., per oz.	0	0	2
Tripoli, prepared, for polishing	"	0	0	6
Water, distilled	per gallon	0	0	8

CALOTYPE AND PAPER PROCESSES.

		£	s.	d.
Acid, Acetic glacial, pure	per oz.	0	1	0
" Gallic	"	0	2	0
" Succinic	"	0	5	0
Ammonia, pure	"	0	0	2
Muriate, free from iron	"	0	0	6
Ammonium, Iodide (variable)	"	0	4	0
Barium, Chloride	"	0	0	6
" Iodide (variable)	"	0	4	0
Gold, Chloride	per dram	0	11	0
" Solution, for darkening positives	per oz.	0	0	6
Iron, Protosulphate, pure	"	0	0	2
" Per-nitrate, solution	"	0	0	3
" Ammonio-citrate	"	0	0	9
" Iodide (variable)	"	0	2	0
Potassa, Chlorate	"	0	0	3
" Nitrate	"	0	0	3
Potassium, Bromide, pure (variable)	"	0	3	0
" Cyanide	"	0	0	6
" Iodide (variable)	"	0	2	6
" Ferrocyanate (yellow prussiate)	"	0	0	4
" Ferridcyanide (red prussiate)	"	0	0	6
" Fluoride	"	0	2	0
Silver, Nitrate, crystallized	"	0	5	0
" " fused	"	0	5	0
" Ammonio-nitrate	"	0	1	0
" Iodide	"	0	10	0
" " in Iodide of Potassium	"	0	1	6
Soda, Hyposulphite . . per lb., 1s. 6d.,	"	0	0	2
Sodium, Chloride, pure	"	0	0	3
" Fluoride	"	0	1	6
Sugar of Milk	"	0	0	4
Solution for iodizing waxed paper	per pint	0	5	0
" rendering " sensitive	"	0	9	0
White Wax	per lb.	0	3	6

COLLODION AND ALBUMEN GLASS PROCESSES.

		£	s.	d.
Acid, Acetic glacial	per oz.	0	0	8
" Arsenious	"	0	0	4
" Pyrogallic, pure	per dram	0	2	6
" Sulphuric, pure	per oz.	0	0	2
" " common	per lb.	0	0	3
Ammonia, pure	per oz.	0	0	2
Ammonium, Iodide (variable)	"	0	4	0
Barium, Iodide, "	"	0	4	0
Baryta, Nitrate, pure	"	0	0	3
Collodion	"	0	0	8
" Iodized	"	0	0	9
Æther, Sulphuric, rectified	"	0	0	6
Iron, Protosulphate, pure	"	0	0	2
" Protonitrate, solution	"	0	0	3
" Iodide (variable)	"	0	2	0
Potassa, Nitrate, powdered	per lb.	0	1	0
Potassium, Iodide (variable)	per oz.	0	2	6
Silver, Nitrate, crystallized	"	0	5	0
" Iodide	"	0	10	0
Soda, Hyposulphite . . per lb. 1s. 6d.,	"	0	0	2
Varnish for protecting glass pictures	"	0	0	4
Solution for rendering negatives positive	"	0	0	4
Iodizing solution for Collodion	"	0	0	6

The foregoing prices are subject to variation.

From the uniform success that has attended the use of Bland & Long's Collodion in the taking of portraits and views, and the corresponding demand for it in the country and foreign parts, they have been induced to sell this article separately from the iodizing compound in any quantity, thus enabling operators whose time is limited and uncertain, and also those who reside in remote districts, to prepare the compound as required for use, obviating the necessary waste consequent on the Collodion becoming discoloured and useless by keeping.

ESTIMATES

FOR

SETS OF PHOTOGRAPHIC APPARATUS.

(The following prices do not include a supply of Silvered Plates.)

DAGUERREOTYPE APPARATUS.

		£	s.	d.
No. 1.	Set of Daguerreotype Apparatus, for taking pictures 4¼ in. by 3¼ in., 3¼ in. by 2¾ in., and 2½ in. by 2 in.; consisting of No. 1 walnut sliding body Camera, with single Achromatic Lens, mounted in brass front, dark slides for plates, ground focussing glass, &c.; Bromine and Iodine pans, with air-tight glass covers, and set of frames; 3 Plate Holders; 3 Plate Boxes; 2 velvet polishing Buffs; Mercury Box, with thermometer; Porcelain Washing Tray; Gilding Stand, with levelling screws; Improved Pliers; Glass Spirit Lamp; Funnel; Filtering Paper; with all the necessary Chemicals, and Polishing Materials, in hard wood boxes. The whole packed in two stained cases, with locks and handles	6	6	0
	Ditto, of superior construction . .	10	10	0
	If with Compound Achromatic Lens, and double Iodine and Bromine Boxes, forming a more complete set of apparatus	15	15	0
No. 2.	Complete set of Daguerreotype Apparatus, for portraits from 2¾ in. by 3¼ in., up to 6½ in. by 4¾ in., with best Compound Achromatic Lens, mounted in handsome brass front, rackwork adjustment; sliding body Camera of mahogany, with dark frames, focussing glass, &c.; improved Compound Iodine and Bromine Box; 2 polishing Buffs; 4 Plate Boxes; 4 Polishing Blocks; Head Rest; Mercury Box, with thermometer; Washing Tray; Gilding Stand; Improved Pliers; Spirit Lamp; Funnel and Filter Paper; Hard wood boxes, containing Polishing Materials, with all the necessary Chemicals and Materials. The whole packed in two stained wood cases, with locks and handles . .	23	0	0

ESTIMATES FOR SETS OF PHOTOGRAPHIC APPARATUS.

		£	s.	d.
No. 3.	Complete set of Daguerreotype Apparatus for taking pictures up to 8½ in. by 6½ in.; consisting of sliding body Camera, with dark frames, focussing glass, &c., Compound Achromatic Lens, mounted in handsome brass front, with rackwork adjustment; Compound Iodine and Bromine Apparatus, complete; Polishing Buffs; Plate Boxes; Polishing Blocks; Camera Stand; Head Rest; Mercury Box; Washing Pans; Gilding Stand; Improved Pliers; Spirit Lamp; Funnels; Polishing Boxes; Filtering Paper, &c.; with a good supply of all the necessary Chemicals, Materials, &c. The whole carefully packed in two cases, with locks and handles .	40	0	0
No. 4.	Complete set of Daguerreotype Apparatus, suitable for a Public Institution or a professional Photographer; comprising large Camera, with necessary slides for plates, ground focussing glass, Combination Achromatic Lens, mounted in handsome brass front, with rackwork adjustment, for taking portraits, groups, or views up to 8½ in. by 6½ in.; also a small Camera, with short focus double combination Achromatic Lens of large aperture, for taking portraits up to 4¼ in. by 3¼ in. in dull weather; Polishing Lathe, with circular Buffs; 3 hand Buffs; Set of metal Plate Holders; Heating Stand; Large Bromine and Iodine Apparatus; Set of Plate Boxes; Camera Stand; Head Rest, for chair; also Head Rest with heavy iron foot, for full-length portraits; Mercury Box, for different sized plates; Lamp, with yellow glass shade; one gallon Still, and worm tub, complete; Gilding Stands; Stoneware Filter; Porcelain Dishes and Filter Stands; Funnels and Filtering Paper; Spirit Lamps; Daguerreotype Colours and Brushes; India-rubber Bottle; Glass Measures; Two Painted Backgrounds; with a full supply of Chemicals, Polishing Materials, &c., complete	110	0	0

ESTIMATES FOR SETS OF APPARATUS FOR THE PAPER PROCESSES.

No.		£	s.	d.
No. 1.	Complete set of Calotype Apparatus; consisting of Mahogany Camera, with Achromatic Lens, 1¾ in. diameter, in brass front, for taking pictures 6 in. by 5 in., ground focussing glass, dark slide for prepared paper; Porcelain Dish; Calotype Board for preparation of paper; Glass Rod; Reversing Frame; 1 quire Photographic paper; 1 quire Bibulous ditto; Lamp, with yellow glass shade; Scales and Weights, in oak box; 1 oz. Measure; Minim ditto; with all the necessary Chemicals, &c., in stoppered bottles. The whole packed in deal case, with lock and key	5	5	0
No. 2.	Complete set of Apparatus for the Calotype or Waxed Paper process; consisting of mahogany Camera, with single Achromatic Lens, 2¼ in. diameter, mounted in brass front, with necessary diaphragms for taking pictures 7 in. by 6 in., ground focussing glass, Back for paper; 2 Porcelain Dishes; Calotype Board for preparation of paper; Drawing Pins; 2 Glass Rods; Reversing Frame; 2 quires of Photographic paper; 2 quires of Bibulous ditto; Lamp, with yellow glass shade; Scales, with set of weights from 1 grain to 2 drams, in oak box; 1 oz. Measure; Minim or drop ditto; Funnel; with all the necessary Chemicals, &c. The whole packed in case, with lock and key	6	16	6
No. 3.	Complete set of Apparatus for the Calotype or Waxed Paper process; comprising mahogany Camera, with Achromatic Lens, 2⅝ in. diameter, mounted in brass front, with necessary diaphragms and sliding plate for adjustment of foreground and sky, with double back for paper 9 in. by 7 in., ground focussing glass; 2 Porcelain Dishes; Calotype Board; Drawing Pins; 2 Glass Rods; Reversing Frame for obtaining Positives; 2 quires of Photographic paper; 2 quires of Bibulous ditto; Lamp, with yellow shade; Scales and Weights; Glass Measure; Minim ditto; Funnels, &c., &c.; with all the necessary Chemicals, complete. The whole packed in case, with lock and key . . .	10	10	0

ESTIMATES FOR SETS OF APPARATUS FOR THE PAPER PROCESSES.

No. 4.	Set of Calotype Apparatus; comprising a mahogany Camera, fitted with Compound Achromatic Lens, in handsome brass front, sliding plate for adjustment of proportion of foreground and sky, ground focussing glass, double back for paper, of best construction, adapted for views 9 in. by 7 in., or portraits up to 6 in. by 5 in.; 2 Porcelain Pans; Calotype Board for preparation of Paper; Drawing Pins; 2 Glass Rods; 1 oz. Glass Measure; Minim ditto; 2 Glass Funnels; Reversing Frame, for obtaining Positives; 3 quires of Photographic Paper; 3 quires of Bibulous Paper; set of Scales and Weights, with glass pans; with a full supply of Chemicals in stoppered bottles. The whole carefully packed in case, complete .	16	16	0
No. 5.	Portable Calotype Apparatus; consisting of a Folding Camera of the best construction, with ground focussing glass, double back for prepared paper, single Achromatic Lens, 2¼ in. diameter, in brass front, sliding plate for adjustment of proportion of foreground and sky, adapted for pictures 7 in. by 6 in.; 2 Calotype Washing Pans; Board for preparation of paper; Reversing Frame; Drawing Pins; 2 Glass Rods; 1 oz. Glass Graduated Measure; Minim ditto; 2 Glass Funnels; 2 quires of Photographic Paper; 2 quires of Bibulous ditto; Set of Scales and Weights, with glass pans; with a full supply of Chemicals, &c. The Camera packed in leather sling case, for convenience of carriage: the Chemicals and other Apparatus in case, with lock and key	13	13	0
No. 6.	The same Camera and Apparatus as foregoing, but fitted with a double Achromatic Lens, mounted in handsome brass front, with a short focus opening in Camera, &c., suitable for views 7 in. by 6 in., and portraits or near objects 6 in. by 5 in. The Camera and double back packed in leather knapsack, and the other Apparatus in case complete, with lock and key	20	0	0

ESTIMATES FOR SETS OF APPARATUS FOR THE PAPER PROCESSES.

		£	s.	d.
No 7.	Portable Folding Camera, with double back for prepared paper, 9 in. by 7 in., ground focussing glass of best construction, fitted with single Achromatic Lens, with sliding plate for adjustment of proportion of foreground and sky; Calotype Board for preparation of paper; Drawing Pins; 2 Glass Rods; 1 oz. Graduated Measure; Minim ditto; 2 Funnels; 3 quires of Photographic Paper; 3 quires of Bibulous Paper; 2 Porcelain Pans for washing paper; Reversing Frame; Set of Scales and Weights, with Glass Pans; with a full supply of Chemicals, &c. The Camera, with back and lens, packed in leather case for convenience of carriage. The Chemicals and other Apparatus in strong case, complete with lock and key .	16	16	0
No 8.	Portable Apparatus, same as above, fitted with Compound Achromatic Lens for views, 9 in. by 7 in., or portraits and near objects, 7 in. by 6 in., with a full supply of Chemicals and materials. The Camera and backs packed in leather sling case, as also the lens; the Chemicals and Apparatus packed in separate wood case, with lock and key	30	0	0
No. 9.	Apparatus complete for views, 12 in. by 10 in., consisting of mahogany Camera, with double back for prepared paper, single Achromatic Lens, with sliding plate for adjustment of foreground and sky; Calotype Washing Pans; Boards for preparation of paper; Reversing Frame; Glass Rods; Glass Measures; 2 Funnels; 4 quires Photographic Paper; 4 quires of Bibulous ditto; Set of Scales and Weights, with glass pans; and all the necessary Apparatus, Chemicals, and Materials. The whole packed in a strong iron-bound case, with lock and key, fit for travelling .	21	0	0

ESTIMATES FOR SETS OF APPARATUS FOR THE COLLODION PROCESS.

		£	s.	d.
No. 1,	Comprising Mahogany Camera, with single Achromatic Lens, 1¾ in. diameter, in brass front; Dark Slide for plates 4 in. by 3 in., and 3¼ in. by 2¾ in.; 1 dozen each size plate; 2 Plate Boxes; Gutta Percha Bath Stand and Dipper; Washing Pan; Levelling Stand; Reversing Frame; 2 Glass Measures; Scales and Weights; with all the necessary Chemicals. The whole packed in box complete, with lock and key	5	5	0
No. 2.	Set of Apparatus, same as above, but with double Achromatic Lens, rendering it more suitable for portraits	6	10	0
No 3.	Complete Apparatus, consisting of sliding body Camera of superior construction, with dark slide and loose frames for plates, 5 in. by 4 in., and 4 in. by 3 in., Compound Achromatic Lens, in handsome brass front; Glass Plates; Plate Boxes; Gutta Percha Bath Stand and Dipper; Washing Pan; Levelling Stand; Reversing Frame; Glass Measures; Scales and Weights; with all necessary Chemicals, bottles, &c. The whole packed in case complete, with lock and key	10	10	0
No. 4,	Consisting of sliding body Camera, best make, with ground focussing glass, dark slide with 3 loose frames for plates, 6 in. by 5 in., 5 in. by 4 in., 4 in. by 3 in., with best double combination Achromatic Lens, rackwork adjustment; Glass Plates; 3 Plate Boxes; Gutta Percha Bath Stand and Dipper; 2 Washing Pans; Levelling Stand; Reversing Frame; Glass Measures; Scales and Weights; Funnel; Filter Ring; with all the requisite Chemicals and materials. The whole carefully packed in a case, with lock and key	15	0	0
No 5.	Complete set of Apparatus for Collodion pictures 8½ in. by 6½ in. downwards, comprising mahogany sliding body Camera of best construction, with focussing glass, dark slide with loose frames for glass plates, double combination Achromatic Lens, in handsome brass front, with rack and pinion adjustment; Glass Plates; Plate Boxes; Gutta Percha Bath and Dipper; Washing Pans; Levelling Stand; Reversing Frame; Measures; Scales and Weights; with a full supply of all the necessary Chemicals, &c. &c. The whole packed in stout case, with lock and key	30	0	0

STEREOSCOPES, & STEREOSCOPIC PICTURES.

Stereoscopes are of two kinds, namely, the Reflecting Stereoscope of Professor Wheatstone, and the Lenticular or Refracting one of Sir David Brewster. They both possess the power, as their name implies, of exhibiting objects properly prepared as solids; that is to say, precisely as we see them in nature, having three dimensions—length, breadth, and thickness.

The Reflecting Stereoscope is best adapted to the display of large pictures and views; while the Lenticular one is most suited for the exhibition of portraits, architectural subjects, still life, groups of statuary, and such objects which do not suffer by being reduced to pictures of small size.

One of the most beautiful applications of Photography of late is, the taking of pictures fitted for the Stereoscope; in fact, this is the only really correct means by which we can obtain them.

			£	s.	d.
Reflecting	Stereoscopes,	for large views . . .	3	3	0
Refracting	ditto,	japanned tin, with diagrams .	0	3	0
Ditto	ditto,	mahogany, "	0	10	0
Ditto	ditto,	black wood, " .	0	12	0
Ditto	ditto,	rosewood, " .	0	15	0
Ditto	ditto,	in mahogany, very superior .	0	18	0
Ditto	ditto,	in walnut, with ivory eye pieces	1	10	0
Ditto	ditto,	maple, " "	1	12	6
Daguerreotype Pictures for ditto . . 5s., 6s., 10s., &			0	12	0
Calotype Views on paper . . 2s. &			0	3	6
Transparent Albumen Pictures on glass, 5s., 7s. 6d., 9s. &			0	10	0
Large Views for Reflecting Stereoscopes, per pair, 10s. &			0	12	0

Messrs. Bland & Long are continually adding new subjects to their stock of Stereoscopic Pictures.

STEREOSCOPIC CAMERAS.

	£	s.	d.
Pair of Combination Lenses, of the same focal length, for taking Stereoscopic portraits or views of the usual size for the Lenticular Stereoscope, by the Collodion, Albumen, or Daguerreotype processes, £7 7s., £10 10s. &	12	12	0
QUINETOSCOPE with prismatic Lenses, for Stereoscopic portraits or views	10	10	0
STEREOSCOPIC CAMERA, fitted on the plan as described in the *Photographic Journal*, and known as LATIMER CLARK'S principle; arranged for portraits or views on glass, paper, or Daguerreotype plates The price depending on the size of lens . . . £5 5s. to	30	0	0
LATIMER CLARK'S principle applied to any of the usual forms of Camera . . £1 15s., £2 10s., and	4	10	0

PHOTOGRAPHIC PICTURES.

From the advance that has been made towards the perfection ot the various Photographic processes, Messrs. Bland & Long are enabled to offer for sale the productions of the most skilful manipulators in the art, at moderate prices.

Their portfolios contain Photographs comprising a great variety of subject: Views taken in all parts of the Globe; Architectural Elevations; Details and Perspective Views of the finest Palaces, Churches, &c., in Venice, Russia, France, and Rome; also Views in Egypt, Syria, and the East, &c. &c., Some of these are of large size, measuring 18 in. by 14 in., 14 in. by 12 in., and so on.

These beautiful works will be found of infinite value to the Artist, Architect, and Antiquary. To the former as being the best means of educating the eye in the details of light and shadow; and to the latter as furnishing a ready method of studying inscriptions and characters on ancient monuments and edifices, without the possibility of being misled by the error of a draughtsman.

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